GENERAL INFORMATION

The Farm

QUARTERLY, AUTUMN 1955, FIFTY CENTS

Farming to Beat the Drouth

Bermuda Grass

Drinking Water from Farm Ponds

LIBRARY
SEP 1955

E. J. Lee of Texas
. . . he built fertility and
trapped water with legumes

Slippery, trampled footing no problem with straight-lug "wedge-in" action!

SCRAPING CATTLE PENS is a real test of traction. You have to work *fast* under conditions that cause many tractor tires to spin helplessly. But in this, as in every other farm job, SUPER-SURE-GRIP pulls you through—earns for Goodyear its survey-proved reputation as the tractor tire brand preferred by more farmers than all others *put together!* See America's biggest, most famous farm tire line at your helpful Goodyear dealer's. Goodyear, Farm Tire Dept., Akron 16, Ohio.

SEE WHY SUPER-SURE-GRIP WORKS BETTER, WEARS BETTER:

EXCLUSIVE, RULER-STRAIGHT LUGS, coming closer together at shoulders (A) take a "wedge-in" bite that *firms* loose soil—gives "the greatest pull on earth!"

O-P-E-N C-E-N-T-E-R helps *ruler-straight* lugs bite deeper, pull better!

LONG, EVEN WEAR—*ruler-straight* lugs work evenly against soil, roll smoothly on road—and so wear slowly and evenly!

RE-LUGGING SAVINGS—vastly stronger body keeps Super-Sure-Grip *fit* to re-lug or retread—and *re-use*.

TRIPLE RIB
FRONT TRACTOR TIRE

Tops for the job, the field-proved Triple Rib combines easy steering with maximum flotation. Extra-heavy shoulder ribs can really take it—give long tire life.

GOODYEAR

Super-Sure-Grip—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

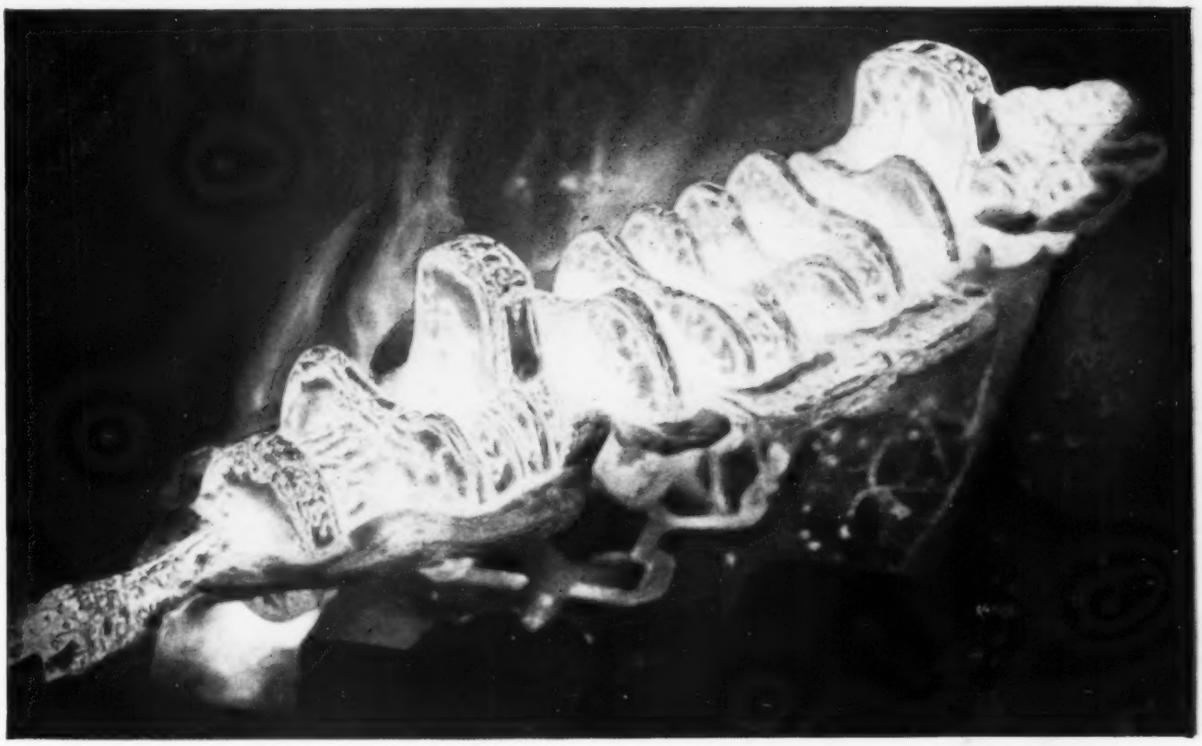
Super-Sure-Grip

GOODYEAR TIRES

Look for this sign; there's a Goodyear dealer near you

MORE FARMERS PREFER GOODYEARS THAN ALL OTHER MAKES OF TRACTOR TIRES PUT TOGETHER!

A farm truck engine needs a "backbone" like this—



From fiery forges come extra-strong INTERNATIONAL crankshafts, designed and built for truck use. Those used in light-duty models are 17% heavier than the average of the forged or cast alloy 6-cylinder designs of the four other leading makes—for maximum strength and rigidity, long life.

to save you the BIG money

Crankshafts are just one example of INTERNATIONAL all-truck engineering that saves you the *big money*.

Of the five leading makes, only INTERNATIONAL builds a complete line of models that are *all-truck*... with no passenger car engines or components asked to do a truck job.

You save the most in farm truck dollars with an INTERNATIONAL that's all-truck built to last longer. It earns its keep in lower over-the-years operating and maintenance cost. It pays for itself in use. It saves you—earns you—the *big money*.

Keeping costs down has made INTERNATIONAL the heavy-duty leader for 23 straight years. Let your INTERNATIONAL Dealer or Branch show you the right INTERNATIONAL for your farm—all-truck built to save you the *BIG* money.

INTERNATIONAL HARVESTER COMPANY • CHICAGO

There's an INTERNATIONAL *exactly right* for every farm hauling job—*all-truck built to save you the BIG money*. 11 pickup models and 15 stake models from 4,200 to 16,000 pounds GVW. Every other truck type. World's widest choice of power and power transmission options.

INTERNATIONAL®
TRUCKS

Ronald Colman, Benita Hume in "The Halls of Ivy," CBS-TV. See local paper for time, channel.

All-Truck Built to save you the BIG money!

International Harvester builds **McCORMICK®** Farm Equipment and **FARMALL®** Tractors... Motor Trucks... Industrial Power... Refrigerators and Freezers

Get MORE for your money with SHUR-RANE®

PORTABLE SPRINKLER IRRIGATION

engineered to your needs!

THESE BOOKLETS TELL HOW!

GET THESE FACTS:

HOW SHUR-RANE boosts corn ... over 50%...

SHUR-RANE in FORAGE

SHUR-RANE in GRAPES

SHUR-ROLL for pasture irrigation

FACTS

CUTTING IRRIGATION COSTS

BUY NOW... PAY LATER!

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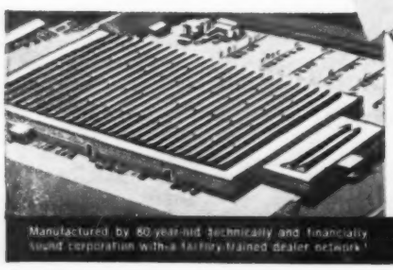
LONG PAYMENT PERIOD
MODERATE INTEREST RATES
ONLY AT SHUR-RANE DEALERS

Write for name of your nearest Shur-Rane Dealer. He can give you full particulars of this first nationwide time payment plan.

...RANE engineers make one acre work for two by analyzing crops, soil, terrain, weather, water and labor supply ... even in so-called wet climates SHUR-RANE will bring bigger, guaranteed returns on your farm investment!



Manufactured by 60-year-old technically and financially sound corporation with a factory-trained dealer network

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Mail Coupon TODAY!

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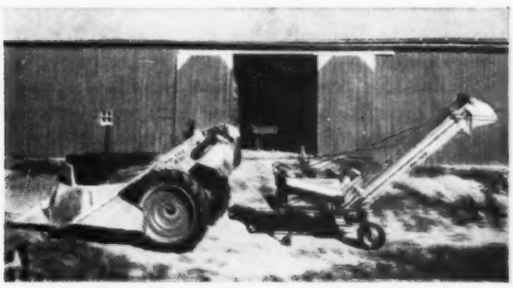
New Idea Corn Pickers...

famed for more ears, fewer husks...in less time



READY TO GO FAST . . . no hoists needed for mounting on tractor. Drive into snapping unit and fasten. Back up to big, 10-roll, trailing husking bed; hitch to draw bar; hook onto power take-off and you're ready to go.

PLENTY OF ACRES PER DAY with well known NEW IDEA Pull Type Pickers (up to 12 acres with one-row model shown above; up to 18 acres with two-row model). Assure a most workman-like job of picking, husking and loading.

Year after year, more farmers pick corn with NEW IDEA machines than with any other make. This confidence has been merited ever since NEW IDEA produced the world's first successful tractor-powered picker. Today, NEW IDEA'S corn picker leadership in efficient performance and reliable construction is most thoroughly established. Whether you manage large acreage or run a family-size farm, there's a NEW IDEA Corn Picker model that will assure you many years of clean fast harvesting at lowest possible cost per acre and per bushel.

TWO-ROW MOUNTED PICKER

A revolutionary concept in design, which provides all the mobility of mounted picker operation, yet requires the tractor to carry only the weight of the snapping unit. The separate husking bed gives it the greatest capacity of any mounted picker . . . rides on its own stout trailer wheels. Fits 26 models of popular row-crop tractors. Makes available right now, the improved picker needed to handle the higher yields you hope to be growing soon.

ONE-ROW AND TWO-ROW PULL-TYPE PICKERS

Models that established the NEW IDEA reputation for clean picking, thorough husking and sturdy dependability. Let your near-by dealer explain their many superior features.

Corn picker demonstrations willingly arranged

NEW IDEA

FARM EQUIPMENT CO. DIVISION AVCO DISTRIBUTING CORP.

Department 1581, Coldwater, Ohio

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- ☐ One-Row Pull-Type Picker
- ☐ Two-Row Pull-Type Picker
- ☐ Elevators
- ☐ Stalk Shredder
- ☐ Wagon & Wagon Box

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ADDRESS_____

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If you own livestock, it's good business to hire a man thoroughly skilled in the practice of modern Health Engineering. Breeding, feeding and growing healthy animals to meet today's increasing demands for profitable production, require expert advice.

Health Engineering can help you produce bigger profits. A successful program of livestock health requires a trained man—one who knows nutrition, one who's a specialist in the techniques of disease prevention, diagnosis and surgery. You know him as your veterinarian.

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Livestockmen who make money keep accurate records. Your animals' heat periods, date of breeding, dates young are dropped, dates and description of disease and injuries—all should be carefully recorded. You should also keep production records—especially of milk production—for these help your veterinarian use his knowledge of Health Engineering to *your* best advantage, help him save precious time, save *you* countless dollars.

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Research is constantly discovering new and better drugs which your Veterinarian employs to prevent and combat livestock diseases. When he administers a Squibb drug, you can have faith in its purity, effectiveness and safety. Nearly a hundred years of experience and pride are behind the words "SQUIBB —A NAME YOU CAN TRUST."

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For prompt, accurate diagnosis, always consult your veterinarian.

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New! FORD MOUNTED CORN PICKERS

Side screens on tractor engine are optional equipment.

TWO ROW—for Ford Tricycle Tractors. Just drive in to attach. No heavy lifting. Most picker weight is on the back wheels for better traction, easier steering. Handy step-on plates on the side—just two easy steps to reach the tractor seat.

Ford's Amazing New
CORN SAVER SNAPPING ROLLS
Cut Shelled Corn Losses in Half

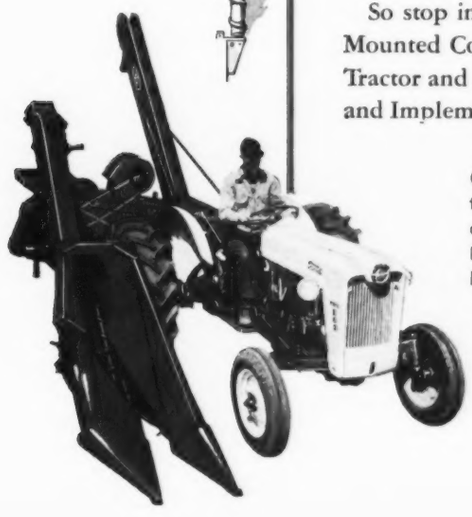
Unlike other pickers! Ears drop off to the side rather than riding *on* the rolls where wasteful shelling occurs. Sure-grip rolls also reduce shelling and clogging. Tests show shelled corn losses are cut in half!

Farmers themselves wrote the specifications for the new Ford Mounted Corn Pickers.

Some said, "Give us mounted pickers that are easier to attach." Others asked for pickers that would do good work in sappy or dry corn . . . clear themselves of stalks better . . . shell less corn . . . remove husks cleaner . . . pick faster in heavy yields . . . operate easier.

All these advantages and many more have been built into the new advanced Ford Mounted Pickers. The result is a new, higher level of picker performance never before available in *any* picker.

So stop in and look over all the features that put the new Ford Mounted Corn Pickers in a class by themselves. Your nearby Ford Tractor and Implement Dealer will be glad to tell you more. Tractor and Implement Division, Ford Motor Company, Birmingham, Mich.



ONE ROW—fits all Ford Tractors. Easy for one man to attach—takes less than an hour—no heavy lifting. Fully mounted, hydraulically controlled. Highly maneuverable. Also available . . . One Row Mounted Corn Harvester, One Row Pull Type Corn Picker, One Row Pull Type Corn Harvester.

Ford Farming

GETS MORE DONE... AT LOWER COST!

JUST One Day IN THE FIELD

and You'll Never Settle for Anything Less

WORDS can't convey how much a John Deere Power Steering Tractor can mean to you. Naturally, you'll marvel at its extreme driving ease the first time you take the wheel. But only when you settle down to a day in the field, will you begin to appreciate what it means to work without strain . . . to guide the tractor *exactly* where you want it to go, without effort . . . to make one-hand turns without stopping to operate other controls . . . to finish up without tired arms and aching shoulders. Best of all, the genuine pleasure and enjoyment of John Deere Power Steering stays with you *on every tractor job, every minute you're at the wheel.* Go back to manual steering? Never!

This farmer, and growing thousands like him, will tell you there is an easier way to farm—the John Deere Power Steering Way.

John Deere *POWER STEERING*

It's the greatest contribution to easier tractor farming in years, and an outstanding engineering achievement. The entire unit is built right into the tractor, where it is fully protected. Field-proved John Deere Power Steering is available for a great family of tractors. It's one of many 'way-ahead features you can enjoy *now* when you choose a John Deere Tractor.

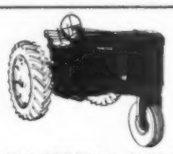
America's First Family of Power Steering Tractors

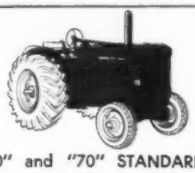
2-3 PLOW "50"

3-4 PLOW "60"

NEW "70" DIESEL

LP-GAS MODELS


MANY SPECIAL MODELS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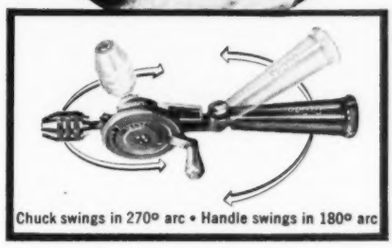
There's No Such Thing as a Difficult Drilling Job...with PROTO's new


Chuck swings in 270° arc • Handle swings in 180° arc

Both professionals and "Do-It-Yourself" handymen will find the PROTO All-Angle drill indispensable for hard-to-get-at drilling jobs in close quarters – next to floors – around obstructions.

Work it straight, or work all the angles . . . it's a versatile addition to any tool kit. Buy it from your PROTO dealer *today!* Send 10¢ for catalog of entire line to

PLOMB TOOL COMPANY
2266F Santa Fe Ave., Los Angeles 54, Calif.

***ALSO NEW!* PROTO**
GRAB-ALL Retrieving and Holding Tool

The tool of 1000 uses for every home, every shop! A push of the thumb, and four strong gripping fingers *grab* objects in hard-to-reach places.

5582

PROTO TOOLS
PROTO means PROfessional TOols

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The Farm QUARTERLY

Autumn, 1955, Volume 10, No. 3

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THE FARM QUARTERLY
22 East Twelfth Street, Cincinnati 10, Ohio

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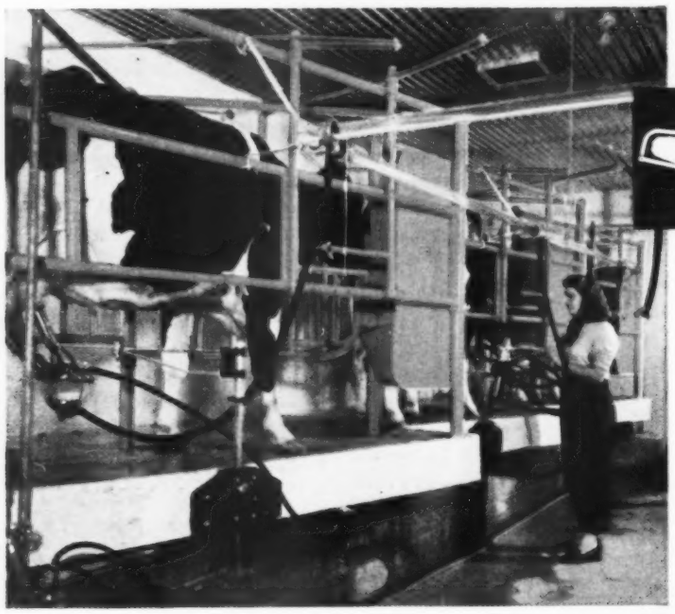
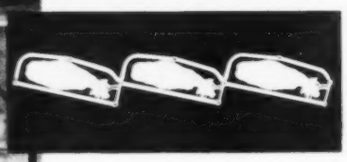
Winter issue on sale December 7 at all Class A newsstands.

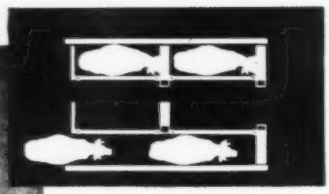
BOTH are built by SURGE





Surge DIAGONAL Milking Stall

The Surge Diagonal Stall, first sold in 1935, is now widely used by dairymen all over the world. Built of finest high-carbon steel for the greatest possible strength and longest life, it is specially designed to handle your herd—no matter what breed you may have—so you get the very best milking job.



Surge CIRCLE-GATE Stall

This is the new member of the Surge Parlor Stall family—built to give all the strength and long life for which all Surge Stalls are known—and designed especially for the dairyman who wants his cows to walk in a straight line through his milking parlor.

With the Circle-Gate stall and feed box, you can now let out two cows . . . put in two new cows and feed them without taking a single step.

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Please send me further details on your
☐ Surge Diagonal Stall ☐ Surge CIRCLE-GATE Stall

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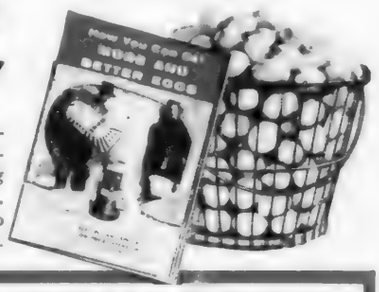
More and Better Eggs!

CASH IN on the fast-growing demand for *quality* eggs . . . the kind that bring *top prices*. Your Wayne Feed Dealer can help you . . . with high-efficiency Wayne Egg Feeds and the valuable "Aids to Higher Egg Quality" shown below. Also, he has for you the *egg quality practices as recommended by the Institute of American Poultry Industries*, contained in this–

FREE
EGG QUALITY HANDBOOK

Pictures and explains *approved methods* of gathering, storing and grading your eggs for *best prices* . . . as well as 4 easy ways to boost your egg *production*.



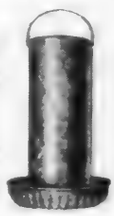
SEE YOUR WAYNE DEALER NOW FOR VALUABLE

"Aids to Higher Egg Quality"*

*AT SPECIAL LOW PRICES WITH PURCHASE OF ANY WAYNE EGG FEED

Plastic Coated Wire Basket
$3.00 Value! Heavy wire, with thick, tough plastic coating. Won't mark eggs. Helps you gather and cool eggs quickly, correctly to protect quality. Holds 15 dozen

Hanging Flock Feeder
$3.95 Value! Newest idea in feeders! Rugged galvanized steel construction. 24" high. Holds 50 lbs. Saves floor space. Simple, easy to move, adjust and clean.



Accurate Egg Scale-Grader
$2.60 Value! Easy-to-read colored dial shows accurate weight of individual eggs as well as weight per dozen. Also a handy grader. Used by thousands of producers.

Egg Room Thermometer
Designed specifically for egg storage rooms by Inst. of Amer. Pltry. Industries. Egg handling directions printed on face. Signals correct temperature limits.

Attractive Egg Cartons
Specially designed by leading U.S. carton mfr. Strong, sturdy, protects against egg breakage. Easy to set-up and close. Positive locking. Packs 30 dozen to standard egg case.

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60¢ Value! New plastic design with sponge rubber cushion for less egg breakage and faster cleaning. Whisks dirt from eggs to avoid price discounts.

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7 High Efficiency Egg Feeds!

MASH-SCRATCH: Feed *Wayne Egg Mash* 50 50 with farm grains. Nutritionally balanced. No mixing or grinding necessary.

ALL-MASH: Feed *Wayne Universal Egg* straight from bag. Complete. Every bite balanced. No scratch grains needed.

NOON FEED: Feed *Wayne 26% Egg & Breeder* on top regular feed. No moist mash needed. Boosts feed intake, holds body wt.

CAGED LAYERS: Feed *Wayne Cage Layer*. Special formula meets needs of high producing hens under exacting conditions.

BREEDERS: Feed *Wayne Breeder Mash* to flocks held for producing hatching eggs. Start feeding 30 days before saving eggs.

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CONCENTRATES: Let your Wayne Feed Dealer tell you how to use *Wayne Poultry Mixer* if you have abundant grain.

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preferred by more people
than any other brand!

Get those *extra* hours of field time (*less* shop time) with Perfect Circle 2-in-1 Chrome piston rings!

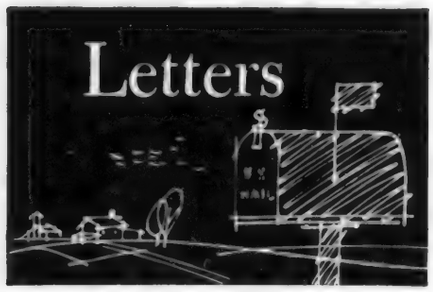
Top performance is assured because:

1. In Perfect Circle's 2-in-1 Chrome set, *both* top ring *and* oil ring are plated with thick, solid chrome!
2. *Entire* area of ring travel gets *complete* wear protection assuring more than double the life of cylinders, pistons and rings.
3. No tedious break-in...rings are lapped-in at factory!

Insist on Perfect Circle 2-in-1 Chrome piston rings for your car, truck or tractor...for sustained power and *positive* oil control! Perfect Circle Corporation, Hagerstown, Indiana; The Perfect Circle Co., Ltd., Toronto, Ontario.

Perfect Circle 2-in-1 Chrom piston rin

The Standard of Comparison



Frozen Semen

Sirs:

I have read the article on artificial insemination and enjoyed it very much. I think every dairyman who reads it will find it both interesting and enlightening.

Sidney Stoltz.

Plainview, Minn.

Sirs:

I am concerned about the enthusiasm with which many breeders have gotten into the proposition of freezing semen. The technical problems in this field are tremendous and many breeders and local technicians of artificial breeding units are really not competent to do the job which has been so enthusiastically endorsed by many people. Consequently, I have the feeling that over the years there are going to be many disappointments in the use of frozen semen by people who have not been carefully trained in handling this interesting biological material.

Another factor which merits very careful consideration is the proposition that each advance in semen handling techniques makes the potential of this practice greater from the standpoint of either improvement of cattle or down-grading of them. It is really doubtful in my mind if the bull selection practices used in the United States really merit the technique in which so many thousands of cattle can be inseminated with the semen of one single bull. I have the feeling that, technically, semen handling methods and the whole field of artificial insemination is running way ahead of an applied genetics program in dairy cattle breeding and that the implied improvement from the mere fact that a single bull could produce 100,000 calves is over-optimistic.

G. W. Salisbury

College of Agriculture
University of Illinois
Urbana, Illinois

Reunion—By 9-Year-Old Carolyn

Sirs:

I'll explain this picture. Another stallyan tried to take over the White Stallan's herd. So the White Stallyan chaste him away. So the white stallyan's mate is comeing to him.

Carolyn Sue Schlegel

Homedale, Idaho

A Rose By Another Name—

Sirs:

In your Summer issue you show a picture of what you call Field Bind Weed or Creeping Jenny (Convolvulus Arvensis). This picture definitely is not Field Bind Weed, but is Hedge

CAN 3 SEEDS

OUT-YIELD 4 ?

Higher yields with *less* seed? More growing space per plant for grain, grass, and legumes?

The new Allis-Chalmers ALL-CROP Drill . . . world's first quick-hitch, tractor-mounted drill . . . makes this a practical possibility on your farm!

Seed and fertilizer are accurately metered a new way . . . in twin bands side-by-side . . . *faster* . . . at uniform depth. Seedlings are *side-nourished* . . . protected from fertilizer burn.

You not only save costly seed but get stronger stands . . . quicker catches of grass and legumes with your grain.

Designed for many crops and uses, the low-cost ALL-CROP Drill fertilizes and plants grain, grass, and legume seed . . . all in one operation. Or, it can be used as a fertilizer spreader alone. With handy SNAP-COUPLER Hitch and time-saving hydraulic lift, the ALL-CROP Drill matches the big acre capacity of its famous namesake, the ALL-CROP Harvester.

Make your seeding dollars yield more . . . a *lot* more! Don't delay. See your Allis-Chalmers dealer *now* . . . or write us for free illustrated catalog.

FARM EQUIPMENT DIVISION, MILWAUKEE 1, WISCONSIN

Ingenious Allis-Chalmers *Micro-Feed* accurately meters the seed . . . spaces kernels evenly in the row . . . at faster speeds. Positive *Force-Flo* system drills or broadcasts fertilizer evenly.

Dotted lines show how new Torsion-Spring design maintains uniform seeding depth in uneven ground. New "bellows-type" spouts allow far greater flexibility. Grass seed is broadcast or band-seeded.

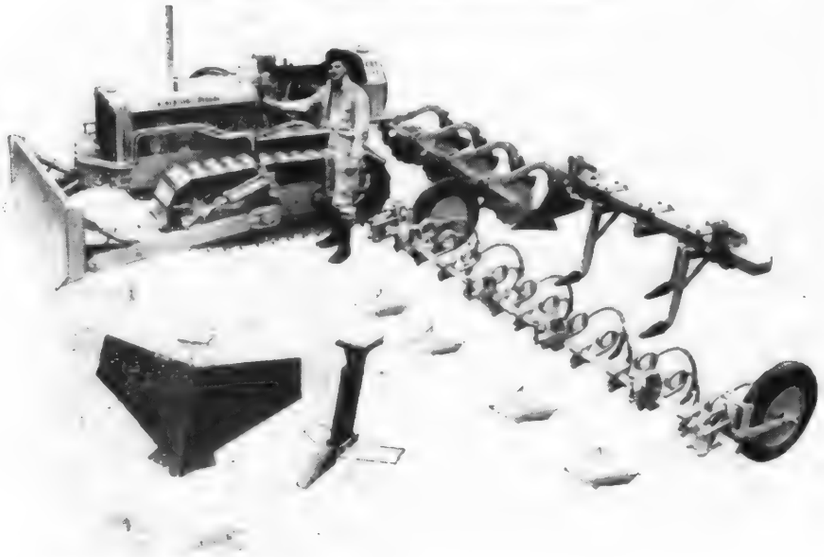
ALL-CROP and SNAP-COUPLER are Allis-Chalmers trademarks.

ALLIS-CHALMERS

TRACTOR-MOUNTED
ALL-CROP Drill
FOR WD-45, WD, OR CA TRACTORS

BUILD YOUR MODEL FARM
WITH
CAT* TOOL BAR EQUIPMENT

In your mind's eye, you've blueprinted your ideal farm. A well-landscaped farmstead with neat fence rows; deep, fertile soil, free from wet spots and time and crop-stealing gullies . . . a farm pond for recreation.



NOW... any farm can become an ideal farm for Caterpillar owners. Cat farm equipment puts your blueprint into action . . . gives you that extra margin of time and economy you need: *power* you need to pull far wider hitches than you can with gas wheel tractors of similar "rated" horsepower; *traction* to help you accomplish up to 60% more; Caterpillar diesel *economy* to cut your fuel costs 60% to 80%.

That's the beginning. *Now, outfit your Caterpillar Diesel D2 or D4 Tractor with extra-rugged Cat Tool Bar Equipment and you're ready for those extra jobs that make your farm outstanding in your neighborhood.*

FORM YOUR LAND with a Cat Tool Bar 'Dozer — smooth off the high spots, fill in the low places. Form your land to eliminate bothersome point rows. Bulldoze fence rows, clear waste areas, fill in gullies, build terraces, landscape your farmstead.

BUILD A MORE PRODUCTIVE TOPSOIL with a Cat Subsoiler or Chisel — subtill your soil to give crops a deeper root zone. Let water soak in to be stored in the subsoil. Unlock the nutrients in the soil for plant food. Destroy plow pan and hard pan.

CONTROL YOUR MOISTURE with specialized Cat Tools — build drainage or irrigation ditches. Put the water where you want it with a Cat Diesel Tractor, equipped with a Cat ditcher, furrowers, listers, or disk ridger.

HANDLE EXTRA JOBS — full line of matched tool bar equipment is available through your Caterpillar Dealer — loader, roll-over plow and many others. Now's the time to start building that farm of the future . . . and your Caterpillar Dealer is ready to help you every step of the way. See him soon!

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

CATERPILLAR*

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

Bind Weed (Convulvulus Sepium). These two weeds are often confused due to their similarity. There are, however, marked differences once they are known which make them very easy to tell apart. The flowers on the Field Bind Weed are about half as large as the Hedge Bind Weed. The leaves on the Field Bind Weed are about half as large as the Hedge Bind Weed. The leaves on the Field Bind Weed are three-pointed whereas the leaves on the Hedge Bind Weed are five-pointed. The weed you show, which is commonly called Morning Glory, can become just as troublesome as the Field Bind Weed. The best control for any weed is "DON'T PLANT THEM."

James C. Anderson

Lanesboro, Minn.

And It's Open Season

Sirs:

Some old bag might not agree with your article, "How a Farmer Should Pick a Wife." Well, if you find any type one around, I'll make it worth your time to send them around. Don't let a few comments discourage you. Keep this kind of information coming to us farm boys who are still single.

Joe Ankus

Stillwater, Oklahoma

A Cow An Acre In New Zealand

Sirs:

In the Farm Quarterly, Winter 1955, you ran an article on 60 acres—20 cows. As a comparison, I am enclosing a cutting of a New Zealand farm that runs 82 milking cows on 80 acres. This is not uncommon in some districts such as the Bag of Plenty, where 40-50 acres run 30-50 cows, with no hired labour, and a gross return equivalent of $6000-$8000 in U. S. A.

Colin Spratt

Te Puke, New Zealand

Gee or Haw?

Sirs:

We had a discussion about oxen here, so I went to the Grand Rapids Library for information; they referred me to you.

What we want to know is, the command you give an ox team for Gee—Haw, none of us can think of it.

G. C. Smith

Grand Rapids, Mich.

Farm Quarterly, Vol. 5, pp. 78-79, Winter, 1951, says commands vary with the ox trainer. Some use Gee and Haw, others synthetic shouts or words intelligible only to the animals.

THE FARM'S PICTURES

Cover by Fred Knoop

16—Wes Guderian Studio. 30 through 35—Fred Knoop. 36—Dr. R. D. Turk, Texas A. & M. 37—Fred Knoop: Coll. Vet. Med. Ohio State Univ.: Coll. Vet. Med. Univ. of Illinois. 38—Drawing by Fred Eichenberger: Coll. Vet. Med. Ohio State Univ. 39—Dr. R. D. Turk, Texas A. & M. 40 and 41—Kazik Pazovski. 42—Rough Notes Co.: Kazik Pazovski. 43—Kazik Pazovski. 44—Jamesway. 45—Chas. R. Koch. 46—Wisc. Elec. Power Co. 47—Chas. R. Koch. 48—Howard Lathrope. 49—Syl Labrot. 50 through 55—Joe Munroe. Drawing. 54 and 55—Fred Eichenberger. 56—Fred Knoop. 56 and 57 (top) Kazik Pazovski. 57—R. J. McGinnis. 58—Kazik Pazovski. 59—Geo. Hoxie. 60—Grant Cannon: Kazik Pazovski; Geo. Hoxie: Grant Cannon. 61—Grant Cannon. 62—Kazik Pazovski: Drawing by Fred Eichenberger. 63—Kazik Pazovski. 64 and 65—Imperial Oil Limited. 66—Grant Cannon. 67—J. C. Allen & Son. 68 and 69—Kazik Pazovski. 70—Choremaster: Fred Knoop. 71—Fred Knoop. 72 and 73 (bottom) Joe Munroe. 73—(top) Kazik Pazovski.

Owners say: "More Economical, More Powerful, Easier to Handle"

Massey-Harris 44 Special and 2-row Mounted Corn Picker . . . pull type and Self-Propelled Pickers available

This tractor likes to work...

and knows the low-cost way to do it

TAKE a Massey-Harris into the field and you'll see it knows how to work. The power is there . . . smooth, ready, quick-responding . . . more willing, more eager to pull through the tough spots.

You feel it in the way you go down the rows with a mounted corn picker and loaded wagon in tow . . . the way your plow keeps its depth on rolling land . . . the way you disc, plant, cultivate faster . . . the way a Massey-Harris likes to work . . .

. . . and the way it works *for* you. Massey-Harris tractors watch pennies, earn dollars. They require less maintenance, last longer, do more work on less fuel.

This greater power and economy is the result of Balanced Power Design — perfect coordination between the units that *develop* the power, and those that *use* it.

Massey-Harris implements make the most of Balanced Power Design. They match perfectly to the tractor in size and capacity, attach easily whether they fit up front or to its new *wrist-action* 3-point Hitch-All.

Up on the seat of a Massey-Harris you get a different look at what a great tractor it is. You're seated comfortably . . . its handy controls, complete vision, perfect weight distribution, easier steering help you finish the day fresher, do better work.

But you have to drive a Massey-Harris to get the full meaning of its economy, power, ease of handling. Your Massey-Harris dealer will be glad to arrange a demonstration of the gasoline, diesel, distillate or liquefied petroleum model you need for your farm. See him soon.

A new booklet, "Out of the Mailbag", tells the whole story of Massey-Harris economy, power and ease of handling. For your free copy, write Massey-Harris, Dept. J-222, Racine, Wisconsin.

1-2 plow Pacer

2 plow Colt

2 plow Mustang

3 plow 33

MAKE IT A

Massey-Harris

Outstanding for Economy, Power, Ease of Handling

4-5 plow 55

3-4 plow 44 Special

Mr. Smith's record of his corn drying operation which cut the moisture content of his corn from 23.8% to 15.7% for less than ½ cent per bushel.

Pick earlier and store safely with a Quonset® Corn Dryer

"My Quonset corn dryer saved 6,000 bushels of corn for me," says Harold F. Smith, who operates a 400-acre farm near Harvard, Nebraska. "I used 876 kilowatt hours of current," reports Mr. Smith, "for a total cost of $23.02, or less than half a cent a bushel."

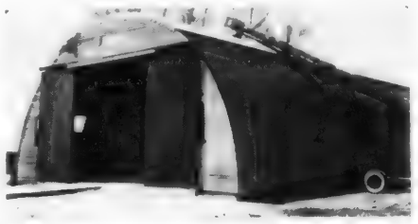
In two weeks the fan was run for 118¾ hours, averaging nearly 10 hours a day. Moisture content was reduced from 23.8 per cent to 15.7 per cent—low enough for safe storage.

Mr. Smith picked his corn earlier and was able to get at other fall work sooner. "I saved corn because it picked cleaner and with less shelling in the field," says Mr. Smith. And he adds, "With these savings and the higher price I get out of my corn for sealing it, my Quonset should pay for itself in 5 years."

Quonset corn storage and drying buildings are eligible under the new income tax provisions which permit farmers to depreciate, for tax purposes, the full value of buildings used for grain storage in five years. Under this tax provision, you can buy a profitable corn storage building and get a cash saving in your pocket this year.

Easily financed on the Quonset Purchase Plan. Quonsets for corn and small grain storage are also eligible for CCC Storage Facility Loans.

"It took just two weeks running 10 hours a day, to dry my 6,000 bushels down to a moisture content of 15.7%, which is safe for storage," says Mr. Smith.



"Loading corn into my Quonset is easy," says Mr. Smith. "Through the open door you can see the 12-foot section in the east end I left for a shop."

STRAN-STEEL CORPORATION
A Unit of
NATIONAL STEEL CORPORATION

STRAN-STEEL CORPORATION
Ecorse, Detroit 29, Mich.
Please send me the latest literature on Quonsets for farm service buildings and the name and address of my nearest Quonset dealer.

Name _____

Address _____

City or County _____ State _____ 3

Farm for the Future...with Quonset®

YOU NAIL TO STRAN-STEEL FRAMING

STRAN-STEEL AND QUONSET REG. U.S. PAT. OFF.

B.F.Goodrich

"**LESS SLIPPAGE** pulling giant loads," says Charles Wiese, Alda, Nebraska

LESTER NITTLER, Elsa, Tex., reports "up to 60% more traction than other makes".

"**NO SKIDDING** pulling out of bogs," Berry Rigdon, Alma, Ga., reports.

"**I NEVER NEED** chains on wet fields," says L. E. Flood, Council Bluffs, Iowa.

Why these farmers pick Power-Grip tractor tires when they need maximum traction

HAULING giant loads in Nebraska, pulling over slick cover crops in Iowa, out of bogs in Georgia or through hard pan in Texas—no matter what the job—these farmers report B. F. Goodrich Power-Grip tractor tires give maximum traction.

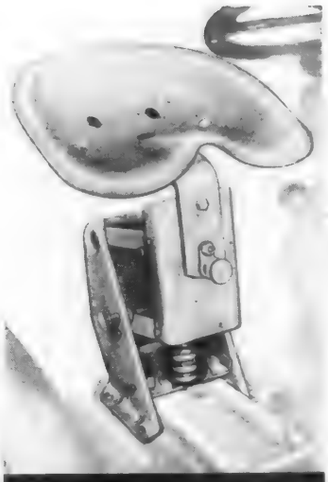
Why? Because Power-Grip tires are bigger all around—they have bigger shoulders and bigger cleats. Size for size, no other tire is wider than Power-Grip. And time after time you'll find that in the same size no other tire has more cleats.

That means this B. F. Goodrich tire takes a firm grip on the soil. You get maximum traction in forward or reverse, even in the toughest going. Power-Grip cleats are higher, too. They penetrate deeper for greater drawbar-pull, wear longer because they're reinforced to stand rigid on hard surfaces.

Why not switch to Power-Grip tractor tires today. You'll agree with farmers all over the country who say that no other tire can beat it. See your B. F. Goodrich retailer—the address is listed under Tires in the Yellow Pages of your phone book—or write *The B. F. Goodrich Co., Tire & Equipment Division, Akron 18, Ohio.*

B F. Goodrich
Truck Tires
***Only* $19.95**
plus tax and your recappable tire
6.00-16 EXPRESS

The Express is ideal for your pick-up and delivery truck. It has the same tread design that came on new trucks, the same tread thickness as tires for far heavier service. And it's fully guaranteed. All popular sizes proportionately low priced. Convenient terms.

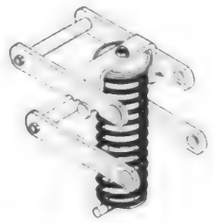


for G-L-I-D-E in the ride

Knoedler
HYDRAULIC SEAT
look for it . . . ask for it . . .

INSIST on it!

"FLOTE-RIDE" is a big Minneapolis-Moline feature! It's provided by a Knoedler Hydraulic Seat, factory-installed on *all* M-M farm tractors and made available as a replacement for older M-M tractors.



THE "HEART" OF A KNOEDLER HYDRAULIC SEAT: the soft coil spring absorbs jolts—the hydraulic shock absorber, inside the spring, controls rebound. Selective notches provide instant weight adjustment. Parallel arm action keeps seat always level as it glides up and down.

IT'S AMAZING how a Knoedler Hydraulic Seat puts glide ——— in place of bounce ∿∿∿∿∿∿... keeping you rested, relaxed—*feeling better.*

IT'S EASIER to do more work . . . keep at it longer . . . do a more careful job with your tractor, hour after hour.

IT'S QUICKER to get a job done—because you can keep right at it with no strain or fatigue from jolts and shocks.

IT'S PROFITABLE to have a Knoedler Hydraulic Seat on every self-propelled machine you own, no matter who drives them. You'll be getting *more* work done.

IT'S SMART to make sure there's a Knoedler Hydraulic Seat on the tractor or self-propelled implement you buy. Over 30 Knoedler designs fit more than 100 different makes and models. *If the factory hasn't put one on your machine, tell your dealer to do it!*

MAIL THIS COUPON FOR INFORMATION
—paste to postcard or use envelope

KNOEDLER MANUFACTURERS, INC.
Dept. 75
Streator, Illinois

Send facts on a Knoedler Hydraulic Seat for the following:

MAKE_____ MODEL_____

I am a farmer ☐ . . . dealer ☐ . . . manufacturer ☐

Name_____

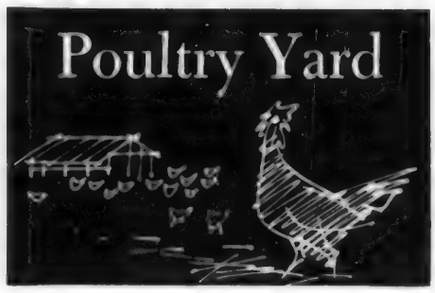
Address or R.F.D._____

Town_____ State_____

PUTTING G-L-I-D-E IN THE RIDE FOR AGRICULTURE AND INDUSTRY

Knoedler

KNOEDLER HYDRAULIC SEATS ARE NOW FACTORY-INSTALLED ON: ALLIS CHALMERS motor scrapers, BROS compaction rollers, CLARK straddle lift carriers, COCKSHUTT tractors, DOMINION road graders, FIELD QUEEN forage harvesters, GARDNER DENVER material handlers, GLEDHILL highway markers, HAHN sprayers & dusters, HERCULES POWDER COMPANY (government equipment), HUBER-WARCO road graders, HYMAN FREEDMAN cushions, MINNEAPOLIS MOLINE farm tractors, OWATONNA windrowers, PETTIBONE MULLIKEN loaders, SEAMAN ANDWALL rollers, SHEPPARD DIESEL tractors, WESTINGHOUSE-LE ROI tractors



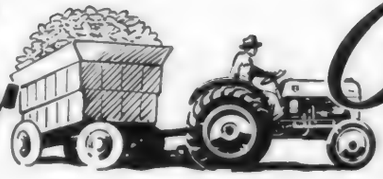
Very Early Molters Poultrymen who keep their layers for a second year's production believe in the old saying, "A dozen eggs in the fall is worth two dozen in the spring." They watch their hens like a chicken hawk to cull out the early molters—for the dropping of feathers is a sure sign that the bird has taken a vacation from egg laying.

There are two schools of thought on how to handle the molt. The majority have used appetizers such as wet mash to force more protein into their birds and have turned on the lights to fool them into thinking that it was still the good old summer time. This has delayed the molt until prices began to sag. A smaller group of poultrymen have tried to force a molt early in the summer by a radical change in feed—no mash at all and a heavy feeding of grain for several days—in the hope of getting them over the molt and back into production in time for the higher egg market. This method has worked well occasionally, but too often it has proved a dud.

Now, Jack Adams, poultry specialist at the University of Wisconsin, has come up with a hormone treatment for triggering the molt. Adams dyed his leghorns blue so that he could tell when the old feathers were dropped and replaced with new, white ones, then he injected them with the hormone progesterone. Most hens stopped laying the day of the injection and came back into production about six weeks later.

Poor Man's Chicken Picker To match the dairyman's two-quart milk pasteurizer and the sheep raiser's one-fleece home loom, we now have the poultryman's eighth-horsepower chicken picker. This gadget, invented by Scott McKendree of Klamath Falls, Oregon, is a rubber paddle which can be attached to an electric hand drill which has a chuck for handling quarter-inch bits. McKendree claims the paddle will wipe off all the feathers, even the pin feathers, from a scalded chicken in six minutes. The paddle sells for $5.00.

For Bigger Better Crops Next Year



Test Your Soil NOW

Fall Is the Most Profitable Time to Test the Soil

It's Easy to Do

You can make tests anywhere, anytime—even out in the field. Get your answers RIGHT AWAY, with the Sudbury Soil Test Kit.

DOUBLE YOUR INCOME

No Fertilizer | Lacked Phosphate | Needed Potash | Fertilized Correctly

10-Fold Increase in Wheat

Without the right fertilizer in the soil, even the best farmer cannot prevent crop failures.

Amazing tests on wheat by a leading ag college show how yield increased ten-fold with proper fertilizer.

A vigorous root system as well as lush, heavy top growth was the result of correct fertilizer guided by soil tests. Even when soil lacked only phosphate or potash, yield dropped nearly 40%.

Bumper Yield—or Crop Failure!

The Agricultural College experimental field at right shows the gain from using correct fertilizer YOUR soil needs.

this corn grown on balanced soil | one missing element caused this failure

The puny plant and deformed nubbin at left are from a field not properly fertilized. Rotted joints and roots made the corn lodge.

Using right fertilizer produced sound stalks and perfect ears as pictured.

Make Every Dollar Spent for Fertilizer Bring Back up to $10 in Extra Yield

Now is the best time to find out what your soil needs to produce bumper crops in every field! These simple 10-minute tests tell how much fertilizer each crop used up this year. The soil is now mellow, easy to take samples, ideal for testing.

Spreading fertilizer this fall takes less time—both weather and soil are more favorable. You save valuable time next spring, avoid bad weather planting delays. In some areas over 40% of all farmers now apply fertilizer in fall instead of spring. Crop experts say putting it on in the fall is just as good.

Save Up to $15 an Acre on Fertilizer

Besides getting bigger yields, you'll save money on fertilizer—use only what your soil needs. Guessing costs plenty—wastes time and money. Fertilizer is the biggest expense on any well-run farm. Your Sudbury Soil Test Kit makes it your best investment—brings you bigger crops, cuts costs way down.

A Pennsylvania farmer was going to spend $700 for lime but not a single field needed any; some already had too much. He not only saved $700, he got better crops without it.

No Knowledge of Chemistry Needed

EASY AS READING A THERMOMETER

So simple, anyone can use it. Even your first tests will be accurate and reliable. Takes only 10 minutes, costs less than 10c a test. No samples to mail, no waiting for reports.

Farmers deLuxe Soil Test Kit

This is the famous Farmers deLuxe Kit, complete with everything for hundreds of tests. More valuable than all your stock and tools! Shows right amount of nitrogen, phosphate and potash for each field. Also whether lime is needed (pH) and how much. Lifetime welded steel chest with carrying handle—built for heavy duty. Weighs only 12½ lbs. Easy instructions show needs of 225 different crops. **Big Value, only $29.95.**

BETTER CROPS Guarantee

YOU TAKE NO RISK

We are so certain you'll get bigger yield, you can send your Kit back anytime within a year if you don't, and we'll refund your money.

If desired, use our Easy-Payment Plan (see coupon).

SEND NO MONEY

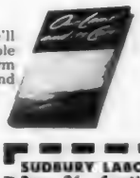
We'll mail C.O.D. plus postage. Or send check and we'll pay postage, saving you from $1.91 to $3.55 in postal charges.

Money-Back Guarantee

If you are not completely satisfied with your Soil Test Kit, return it in 10 days and **get your money back!**

FREE BOOK

If you send check, we'll also include the valuable 64-page book on farm management, "Our Land and Its Care," **FREE!**



Order Right Away!

FREE TRIAL

425,000 Users Can't Be Wrong!

A.D. of Indiana nearly doubled his corn yields as a result of testing his soil. He also gets 30% more wheat and soybeans per acre.

G.H. of Ohio "Have made many tests; like its simplicity and accuracy. Worth 1000 times its cost on my 320 acres; found them low in phosphate."

S.G.H. of Michigan "guessed" his potato field had enough potash but needed nitrogen. Tests showed he was wrong. He saved the nitrogen, bought potash and doubled his yield.

A.F.B. of Iowa increased his bean yield 50% by correcting phosphate and potash deficiencies his Sudbury Soil Test Kit revealed.

W.L.D. of Pennsylvania saved $400 on fertilizer. "The Kit has paid for itself over and over again." That's real satisfaction!

R.S.G. of Indiana tested his soil and discovered potash was badly needed. He has increased his corn yield 20%! He also reduced fertilizer costs by using only what his Sudbury Soil Tests showed was needed.

Hardware, Seed, Grain and Farm Supply Stores: Serve Your Customers by Carrying this Essential Aid to Better Farming.

SUDBURY Soil Test Kits

SUDBURY LABORATORY, Box 26, South Sudbury, Mass.

World's Largest Makers of Soil Testing Equipment

SUDBURY LABORATORY
Box 26, South Sudbury, Mass.

Send me the Farmers deLuxe Sudbury Soil Test Kit at the special low price marked below:

☐ Enclosed is $29.95; send postpaid; include free book, "Our Land and Its Care."

☐ Send C.O.D. plus postage.

Name.....

R.D. or St......

P.O...... *Zone*.... *State*.....

☐ Send on Easy-Payment Plan—I'll pay mailman $4.95 plus postage, then 4 monthly payments of $6.75 each.

Read how FITCHBURG CHIPPER

•CLEANS UP WASTE WOOD
•SAVES NEARLY 50% ON DAIRY BEDDING

TRANQUILLITY FARM
MIDDLEBURY, CONNECTICUT
OWNED AND OPERATED BY
J. H. WHITTEMORE COMPANY
327 CHURCH STREET
NAUGATUCK, CONNECTICUT

Mr. W. O. Forman, President
Fitchburg Engineering Corporation
Fitchburg, Massachusetts

April 25, 1955

Dear Mr. Forman:

The Fitchburg Chipper, Model C-9, which we purchased in 1951 is performing most satisfactorily. We use it at our sawmill mostly to chip pine slabs for stable bedding for our dairy cattle - 102 cows in milk this month. Pole wood, or any hard wood can be chipped as well.

We have a blower attachment so chips are blown into a sawdust pile from the mill. This not only keeps our mill yard cleaned up but furnishes bedding at a saving of about $4.00 per cord. That's a saving of almost half the cost of what we've paid for purchased sawdust or shavings for bedding.

The cost of the upkeep is very low. Knives have to be sharpened every ninety to one hundred hours, but by having two sets of knives we can be using one set while the other is being sharpened. We have found it to cost much less to send you the knives by parcel post for sharpening than to have it done locally. This service is prompt and we're always sure of a good job.

We find Fitchburg Engineering Corporation a very good company, giving prompt and efficient service.

Very truly yours,
J. H. WHITTEMORE COMPANY
Charles W. Miller
Charles W. Miller
Farm Manager

Another Fitchburg Chipper—Model C-6 in action cleaning up wood lot. Chips are used for stable bedding. C-6 easily handles wood up to 4" in diameter, planks 6" wide.

Fine chips made with Fitchburg Chipper used as bedding in dairy barn. Highly absorbent, and have good holding properties. Purdue University says: "Shredded wood chips used in bedding tests in the Purdue Dairy Barn stayed in place better than straw, ground corn cobs or shavings."

LOW-COST MULCH FOR FRUIT GROWERS

Largest peach orchard east of Mississippi – Sunny Slope Farms, Gaffney, S. C., and Bridgeton, N. J., uses Fitchburg Chippers to chip prunings, branches, limbs, into ideal mulch for their 1600 acres of peach and apple trees.

Says Alfred F. Caggiano, Bridgeton Farm, Asst. Manager, "Our Fitchburg Chippers are serving us a twofold purpose. Not only do they save on time and labor, but the chips serve as ideal mulch."

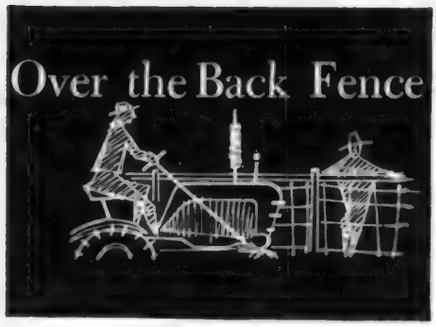
You too, if you have wooded acreage on your farm, can use a Fitchburg Chipper profitably for stable bedding, mulch and poultry litter. There is a Fitchburg Chipper for every need and every pocketbook—from as low as $960.

WRITE FOR FOLDER and specifications.

Address Dept. F95

Free Folder

FITCHBURG ENGINEERING CORPORATION
FITCHBURG, MASSACHUSETTS



The Crystal Ball We have a little more faith when scientists sit around a table and predict than when grandpa says it's going to rain because his bunion hurts. Not long ago Dean L. L. Rummell of Ohio State University, speaking for his stable of agricultural researchers, said that there would come a time when cows would produce 20,000 pounds of milk a year, and that without grain—on roughage alone. Hogs, he said, will produce a pound of pork on 3.4 pounds of feed, and every ewe will have two lambs. They plan to breed out these super-animals by the use of atomic rays and chemicals to produce mutations.

Among the minor boons to mankind which the scientists saw in their crystal ball were perennial wheat, corn beef on the hoof, and livestock with built-in disease resistance. They were caught nodding in one of their predictions, however, that plowing, discing, harrowing and planting will eventually be one operation —one trip across the field. If Dean Rummell's scientists can spare a day or two from their test tubes, we can take them to farms where that very thing is being done right now.

Beware! We suppose it's somewhat stale by now, but it's worth reminding you to beware of a super salesman who might come your way. This fellow sells milking machines. He recently sold a one-cow farmer two machines and then took his cow as a down payment.

Pity the Poor Italian American farmers don't usually count the price of machinery as one of their blessings. A look at the prices paid for tractors in Italy might make the American prices more attractive, even a blessing. If the Italian farmer wants a new tractor he must do a great deal of soul searching, not to mention years of saving, fasting, and self-denial. He can buy a Fordson for $3,166. This tractor would cost the British farmer $1,635 and the American farmer, for a comparable machine, about $1,200. A Ferguson costs the Italian $3,050; the same machine here is priced at about $2,000. The cheapest tractor in Italy is a German Allgaier, which sells for about $2,000, about twice the price of a Farmall Cub, a comparable machine.

HOW TO GET FASTER, CLEANER MILKING AND TOP MILK PRODUCTION...

A De Laval Combine Milker . . . delivering to a De Laval Bulk Milk Cooler!

THE DE LAVAL COMBINE is the *only* pipeline milker that insures *absolutely uniform milking* . . . the *only* milker that gives you Magnetic Pulsation Control, which results in faster, cleaner milking.

Equally vital . . . you get the De Laval Milker Unit—the gentlest and most productive milking hand that ever touched a cow . . . no dangerous tugging and jerking . . . no harmful teat stretch.

There's still another important plus . . . De Laval's simple, foolproof "In-Place" Vacuum Cleaning that cuts wash-up time to the minimum . . . has no tricky gadgets to go wrong.

DE LAVAL BULK COOLERS — either vacuum or open type — are designed first of all for dependability . . . give you day-in-day-out, trouble-free service. And they're backed by De Laval — the greatest name in dairying . . . that always stands for minimum work and maximum profit!

In addition . . . although your De Laval Cooler will probably never need service . . . if it should, there's a nearby De Laval Dealer to handle it efficiently . . . *and fast!*

Get all the profitable facts. See your De Laval Dealer or mail coupon . . . ***today!***

DE LAVAL

. . . . SERVING THE DAIRY INDUSTRY SINCE 1878

THE DE LAVAL SEPARATOR CO., DEPT. W-55
Poughkeepsie, N. Y.

Without obligation, send me proof that a De Laval Combine Milker and Bulk Milk Cooler can increase my milk profits.

I prefer ☐ Separate milking room ☐ Dairy barn installation. I milk about _____ cows.

Name _____

Town _____ RFD ____ State _____

THE DE LAVAL SEPARATOR COMPANY Poughkeepsie, New York • 427 Randolph St., Chicago 6 • DE LAVAL PACIFIC CO. 201 E. Millbrae Ave., Millbrae, Calif.

NEW! Starts *Directly* on Diesel Fuel... winter and summer

CASE "400"

Just push a dust-sealed button and the 12-volt starter brings the Case "400" Diesel to life, directly on diesel fuel. No extra engine, no extra fuel, no preliminaries. The same Powrcel Controlled Combustion system that makes operation smooth at all speeds and loads also makes direct starting swift and sure. For really cold weather the ether-aid speeds starting.

You'll like the Case "400" for its easy riding, easy steering, easy shifting, easy hook-up to Eagle Hitch mounted implements. You'll see the same revelation in performance and economy in the gasoline, LP-gas, and distillate models, too. Arrange now with your Case dealer for a personal demonstration of the finest tractor in the 50 h.p. class. You can get it on the easy, sensible Case Income Payment Plan. J. I. Case Co., Racine, Wis.

Firestone DEEP TREAD

PULLS BETTER...LASTS LONGER...COSTS LESS

No other tractor tire gives so much for so low a price.

A simple comparison between the Firestone "Deep Tread" and other tires in its price range will tell you why. You can easily see that the Firestone "Deep Tread" has more tread rubber for longer tire life . . . deeper curved and tapered bars and big powerful shoulders for maximum drawbar pull . . . and flared tread openings for positive cleaning in any soil condition.

Compare before you buy! Let your nearby Firestone Dealer or Store show you the many other features that help save time in the field and help keep extra dollars in your pocket. He will be glad to give you the low exchange price for your tractor tire size.

FOR MORE TRACTION ON YOUR . . . TRUCK . . . OR CAR

ALWAYS BUY TIRES BUILT BY FIRESTONE, ORIGINATOR OF THE FIRST PRACTICAL PNEUMATIC TRACTOR TIRE

Enjoy the Voice of Firestone on radio or television every Monday evening over ABC

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You'll INCREASE PROFITS with these quality implements!

HARVEY'S *ADJUSTABLE* SIDES HANDLE *ALL* CROPS!

CLOSED for small grain, shelled corn, finely chopped silage, etc.

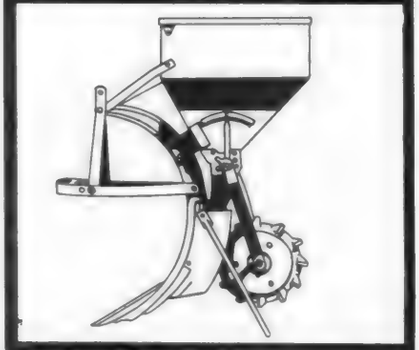
HALF OPEN for ear corn, vegetables, coarsely chopped silage.

¾ OPEN for bagged material, round bales.

FULLY OPEN for baled hay and similar bulky materials.

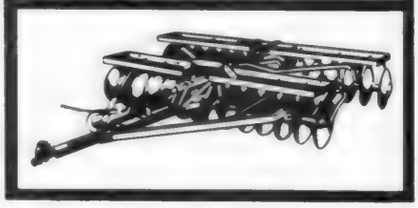
THE HARVEY ELEVATOR

Three quality features make the all-purpose Harvey the most versatile and powerful elevator you can buy: adjustable trough sides (see above); heat-treated special agricultural *roller* chain; special high-strength alloy steel body section with great abrasion and corrosion resistance.



PITTSBURGH DEEP-FEEDER

Greater yields-per-acre are possible with this unique *fertilizing* subsoiler. In a single, efficient operation, it shatters and fertilizes subsoil . . . gives crops added nutrients for better growth. Built with stainless steel working parts, it's easily attached to any 3-point lift type tractor.



RODERICK LEAN HARROWS

Engineered for long, hard service, these sturdy harrows operate efficiently wherever you put them to work—from pasture renovation to seed bed preparation. You can choose from a complete line of disc, spike and spring-tooth harrows to meet *all* your needs!

ASK YOUR DEALER for demonstrations and *all* the profitable facts on these top-quality, long-lasting implements. For free bulletins, write . . .

FARM TOOLS DIVISION

PITTSBURGH FORGINGS COMPANY

79 THORN STREET

CORAOPOLIS, PENNA.

FERTILIZER DEEP-FEEDER, CARRY-LIFT, CULTIVATING STEELS, DISC HARROWS, SPIKE-TOOTH HARROWS, SPRING-TOOTH HARROWS,

Pittsburgh Farm Implements · Roderick Lean · Vulcan · Harvey Racine Lines

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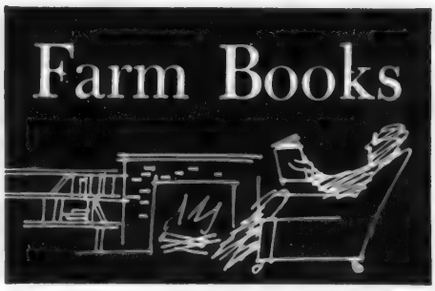
Farm Books



From My Experience, *by Louis Bromfield, Harper & Brothers, New York, $4.00.*

"Whoever has really looked into the eye of a shrewd old sow should feel humility. It is a bright clear eye, more like the eye of a human than the eye of any other animal." With this observation Louis Bromfield opens Chapter 11 of his new book, *From My Experience.* Chapter 11 is titled, "A Hymn to Hawgs," and it is one of sixteen essays in the book on subjects ranging from the pursuit of morel mushrooms to a plan for Brazilian agriculture to roadside markets. While the essays frequently wander into the fields of economics on a national level and take us, geographically, as far away as Brazil, they are in general the spiritual and scientific experiences of Mr. Bromfield during the fifteen years he has lived at Malabar Farm.

There is not a dull page in the book. The same qualities that made *Pleasant Valley* a best seller are found here in abundance; and in many respects this book might be a sequel to *Pleasant Valley.* Mr. Bromfield seems more relaxed and mellow than when he wrote *Pleasant Valley,* and his appreciation and understanding of the spiritual forces behind farming as a way of life have deepened during those fifteen years he has devoted most of his energies to farming. He has one of the best reporter's eyes in the business of writing and this, added to a craftsmanship which is unexcelled, make *From My Experience* a certain candidate for a best seller.

Of especial interest is the chapter on his new Brazilian Malabar. Sixteen pages of photographs by Joe Munroe, printed as a separate section, add a fine visual bonus.

Land Judging, *by Edd Roberts, University of Oklahoma Press, Norman, Oklahoma, $2.50.*

Edd Roberts, the author, is one of the men who pioneered land judging contests. In this book he gives the techniques for judging land as well as the rules which govern land judging contests. This book will be of particular value to those who are entering such a contest with the seller of a farm.

Dairy Cattle, *by Yapp & Nevens, John Wiley & Sons, New York, $4.76.*

Selection, feeding, and management of the dairy herd. Fourth edition.

"WITH AN EATON 2-SPEED AXLE

WE HAUL THROUGH MUDDY GROUND

...SAVE TIME, MONEY AND HOGS!"

...says Farmer A. P. Dacus, West Memphis, Arkansas

"I HAVE 8,500 acres," reports Mr. Dacus. "I raise hogs, plant about half the land in timber, cotton and corn. The river runs by one side, the levee borders the other. So this low land was thought worthless when I bought it. But the Eaton 2-Speed Axle has helped make it pay. We work quickly and safely, keep our expenses at rock bottom.

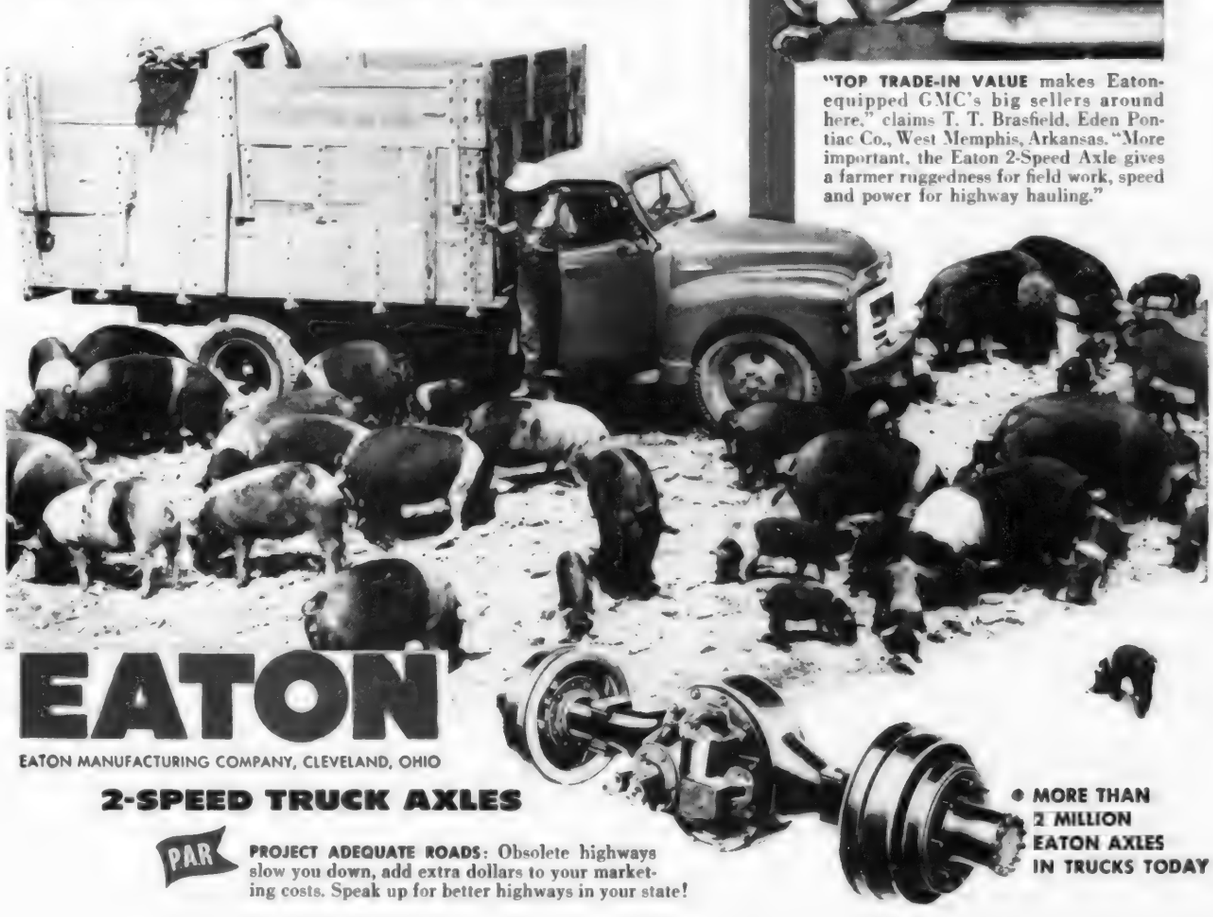
"In the spring, the river overflows. As it runs off, our Eaton-equipped GMC pulls us through the muddy ground, allowing us to get in quickly to work our land. When the river rises suddenly, we have to hustle pigs to high ground. With Eaton's pulling power in low-gear range, we move through river-drenched land smoothly and easily. The truck and load escape damage. We save hours and dollars.

"On over-the-road hauls, Eaton's high-gear range assures top legal speeds at low engine RPM. That saves gas, cuts engine strain —and we make fast trips. Nothing could do the job as well as an Eaton 2-Speed Axle."

Prove to yourself the money-saving utility of the Eaton 2-Speed Axle. Ask your truck dealer for a demonstration.

"FAST, ECONOMICAL road trips—we depend on the Eaton 2-Speed Axle for that," says Mr. Dacus. "In the high-gear range, the Eaton speeds a load at legal limits, keeps down engine RPM—saves time, trouble and expense."

"TOP TRADE-IN VALUE makes Eaton-equipped GMC's big sellers around here," claims T. T. Brasfield, Eden Pontiac Co., West Memphis, Arkansas. "More important, the Eaton 2-Speed Axle gives a farmer ruggedness for field work, speed and power for highway hauling."



EATON

EATON MANUFACTURING COMPANY, CLEVELAND, OHIO

2-SPEED TRUCK AXLES

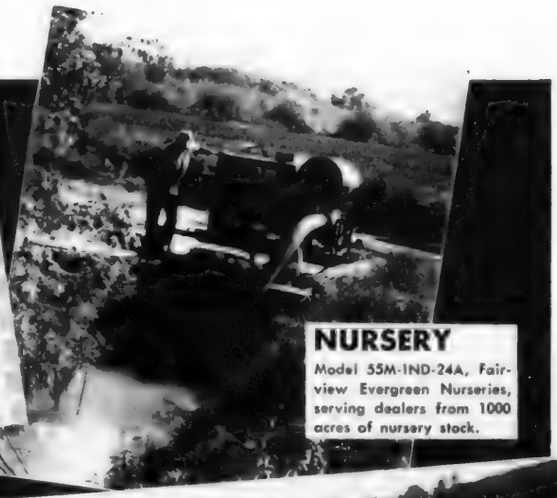
PAR **PROJECT ADEQUATE ROADS:** Obsolete highways slow you down, add extra dollars to your marketing costs. Speak up for better highways in your state!

• **MORE THAN 2 MILLION EATON AXLES IN TRUCKS TODAY**

NORMAL * RAINFALL is Not Enough!

* Speaking of Normal Rainfall . .
1. Good crops need more!
2. Spacing is so important

IRRIGATE and PROSPER



NURSERY
Model 55M-IND-24A, Fairview Evergreen Nurseries, serving dealers from 1000 acres of nursery stock.

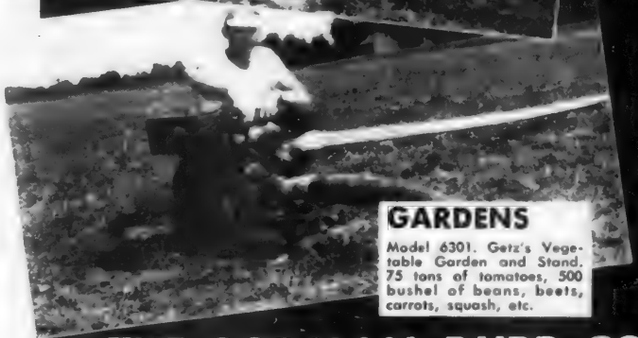
ORCHARD
Model 5" Fig. 701, Diesel powered. Ontelaunee Orchards. Nearly 1000 acres of Fruit Trees.

TREES
Model 55M-IND-24A
Musser Forests famous for 20,000,000 Trees a Year.

DAIRY
Model 54M-134 Jeep engine driven. Cedarbrook Farms, Inc. 175 Registered Guernseys.

FLOWERS
Model 54M-134 Jeep engine driven. Wayside Gardens gain one year in growing marketable perennials.

PASTURE
Model 54M-IND-24A fueled by natural gas. Louis Bromfield's Malabar Farm in Pleasant Valley.



GARDENS
Model 6301. Getz's Vegetable Garden and Stand. 75 tons of tomatoes, 500 bushel of beans, beets, carrots, squash, etc.

GORMAN-RUPP

Complete package units; pump, engine, exhaust priming device, strainer — ready to go to work. Pumps for belt drive and pumps for farm tractor P.T.O.

For Every Irrigation Purpose

80 GPM @ 80 lbs. to 1250 GPM at 125 lbs.
For ditch irrigation — 3000 GPM @ 25 feet

GORMAN-RUPP ORIGINATES
OTHERS IMITATE

THE GORMAN-RUPP COMPANY • Mansfield, Ohio

We have detailed reports available for interested persons on all of the above illustrations.

Earl Douthit's New Holland P.T.O. can chop and load up to 24 tons of corn silage an hour.

"Never choked or slipped *in corn 12 to 14 feet high!"*

Count on New Holland for fast, steady chopping in *any* crop.

Here's the harvester that makes a field day of the highest, heaviest corn.

Few choppers give you New Holland's wide range of cutting lengths . . . ¼" to 4¼". 6-knife flywheel lets you use 1, 2, 3, 4, or 6 knives, a feature that adapts your New Holland to all types of crops.

Alfalfa? Sudan grass? Sorghum? The New Holland features that give you steady cutting in the heaviest corn will also help you harvest any forage crop that grows. Just pick the row crop, direct cut or windrow attachments that fit your operation.

Your New Holland Dealer has all the facts plus a complete line of the most modern forage harvesting equipment. He's your headquarters for grassland information and machines. Call him today. Ask for a free demonstration on your own farm. The New Holland Machine Company.

Says Earl Douthit, "That corn ran 12 to 14 feet high and my New Holland Forage Harvester chopped so fast it filled a wagon every few minutes. It never choked or slipped, just kept chopping 'til the job was done. Some of the corn was down, but my harvester picked it up as easy as you please."

Now there's no need for special down-corn attachments. New Holland's corn head with exclusive fender design and longer snouts sweeps up row crops in any condition. Even in corn knocked almost flat by hurricanes last fall, farmers saved their crops with the New Holland.

FREE! For your copy of a 16-page booklet giving the facts on different types of silos plus a catalog on New Holland harvesters, write: New Holland Machine Co., 909 Elm Street, New Holland, Pennsylvania.

NEW HOLLAND

"First in Grassland Farming"

New Holland, Pa. • Minneapolis • Des Moines • Kansas City • Columbus
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FREE! Strip Cup

with the purchase of each dozen tubes of

TARGOT®

MASTITIS OINTMENT

LEDERLE

MASTITIS CONTROL IS A TWO-STEP PROCESS:

1. Early detection

2. Sound, effective treatment

Here's a combination offer that helps you detect mastitis early — then stops it with the tops in mastitis treatment — TARGOT MASTITIS OINTMENT.

Not one . . . but FOUR proved antibiotics are included in TARGOT—AUREOMYCIN* Chlortetracycline, Penicillin, Neomycin and Dihydrostreptomycin—to stop all the common mastitis-causing bacteria before permanent damage can be done. Lighter-than-milk base floats the four antibiotics into close contact with affected tissues.

This offer is limited...your veterinarian, druggist or feed dealer can furnish it to you. But...act today —while this offer is in effect—to obtain your supply of TARGOT and your Free Lederle Strip Cup for two-step, profit-making Mastitis Control.

*Trade Mark

This offer is limited...
starts September 1, 1955

Regular use of Strip Cup

- Quickly shows abnormal milk—cuts waste
- Induces milk "let-down"
- Cleans out low fat, high bacteria foremilk

Lederle Strip Cup is

- Scientifically designed
- Easy to clean—no screen
- Durable, sanitary non-rusting aluminum

Lederle

LEDERLE LABORATORIES DIVISION

PEARL RIVER NEW YORK

Old fashioned feeding can kick over MILK PROFITS, too!

Seagram

SERVICE TO AGRICULTURE

"THERE'S no use crying over spilt milk." True enough, so long as something is done to prevent it from happening over and over again!

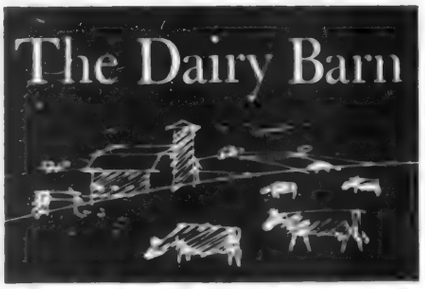
That's why profit-conscious, scientific feeders have learned that it's not the *amount* of feed milk cows eat that counts, but the *nutritional content* of the feed which increases milk production and dollar profits.

When Seagram dried grains are added to balance dairy rations, results are richer milk, and more of it, at less cost per pound of feed. The reason for this greater feeding efficiency is because Seagram dried grains provide B-complex vitamins together with nutritious proteins, minerals, fats, and other important lactation factors.

Be sure that you get your maximum milk profits by including Seagram dried grains in your dairy feed.

"Carload Lot Inquiries are Invited."

JOSEPH E. SEAGRAM & SONS, Inc.
GRAIN PRODUCTS DIVISION
Box 240, Louisville 1, Kentucky



Bloat is Still a Mystery Bloat is the darndest thing. Just about the time a man begins to think he has it all figured out and knows how to keep it from getting his best cows it changes its tactics and he has to start figuring all over again. That's the way it is even with the scientists, too. Take B. F. Barrentine, for example, down at the Mississippi Experiment Station. He has been running bloat studies for a number of years and is willing to admit he is at least as confused now as he was when he started.

Good dairy cows are too valuable to work with in an experiment of this kind, so Barrentine has been using common beef steers and grazing them on Ladino pasture. He turns them on the pasture for an hour and a half in the morning and again for an hour and a half in the afternoon.

Now everyone knows very well that cattle that are unaccustomed to the luxury of legume pasture are the ones which are most likely to bloat when they are turned into a field of this kind and that cattle which are used to it won't bloat. But, says Barrentine, his steers tell him that theory is as out of date as the Bunnyhug. He has critters which will bloat every day—not seriously, of course, but enough to be plainly visible—as long as he keeps them on the Ladino day after day. Let him take them off for a few days and then put them back on again and it will be several days before any of them will begin to show signs of a distended flank. So much for one theory.

Then it has always been pretty obvious that a lush, tall growth of clover is much more dangerous than short, dry stuff. Barrentine's steers knocked this idea into the old hat, too. He showed delegates to the Southern Pasture and Forage Crop Improvement Conference, at Knoxville this summer, pictures of rich Ladino 9 or 10 inches tall which failed to cause bloat. But a parched growth which failed to cover his hand when laid flat on the ground was a sure-fire bloat producer.

The Mississippi steers bloated as often and as violently in the morning as they did in the afternoon and vice versa. They bloated on fields which contained 80 per cent rye grass and only 20 per cent Ladino. Some that bloated badly one year failed to bloat at all the following year. Some bloated on as little as 9 pounds of the clover.

Barrentine was able to discover no feed—forage or grain—which he could say has a specific protective action against bloat. In other words, this business of filling them up on hay before you turn them out is far from foolproof.

All of which should make every farmer happy to know that his neighbor's theories on bloat prevention are all wrong.

But Milk Fever Can be Licked Milk fever is a malady entirely too familiar to many dairymen. A good cow will go down with paralysis shortly after calving, possibly lose consciousness, and she may die if she is not treated. Intravenous injections of calcium salts is the common treatment as the disease is associated with the sudden drain of blood calcium which occurs at the beginning of lactation.

Dr. W. D. Pounden, Professor of Veterinary Science and Dr. J. W. Hibbs, Professor of Animal Science at Ohio State University, have now come up with what looks like a very good preventive. This is the feeding of large doses of vitamin D for 5 to 7 days before calving to cows believed to be susceptible to the condition. The doses may be as heavy as 30 million units per day of either type 142-F irradiated dry yeast or Viosterol, an oil concentrated irradiated egosterol.

REGISTERED HOLSTEINS *Thrive Outdoors*

Even when the mercury goes *down*, rugged Registered Holsteins keep the milk flow *up*.

Pampering dairy cattle costs money . . . but that isn't necessary with Registered Holsteins. They're well adapted and produce efficiently in every section of the country.

Capacity to consume and convert low-cost roughages into milk, summer or winter, makes the difference today. It's Registered Holsteins that do the job.

Registered HOLSTEINS *Breed of the Times*

THE HOLSTEIN-FRIESIAN ASSOCIATION OF AMERICA
BRATTLEBORO, VERMONT

Kelsey-Hayes wheels on the farm

As mechanization has supplanted animal power on the farm, the past half-century has witnessed the growth of agricultural America to the world's most productive and prosperous farming nation.

Kelsey-Hayes is proud of the role it's played in this progress. Since 1888, our French & Hecht Farm Implement Division at Davenport, Iowa has been solely devoted to the making of wheels and vital parts for the machinery and implements of agriculture. ***Kelsey-Hayes Wheel Co., Detroit 32, Mich.***

KELSEY HAYES

World's Largest Producer of Automotive Wheels

Wheels, Brakes, Brake Drums, Special Parts for all Industry • 9 Plants — Detroit and Jackson, Mich.... McKeesport, Pa.... Los Angeles ... Windsor, Ont., Canada ... Davenport, Ia. (French & Hecht Farm Implement and Wheel Div).

"In June this year we had some wheat that wasn't going to make grain, so we sent the chisels through it. Better to save the moisture than fool around with that kind of stand," said John Garrett of Clovis, New Mexico. In the tractor seat in the photograph above, Garrett shows the right technique for pulling a 30-foot Graham-Hoeme plow. "Set her on the hydraulic depth control quadrant for about 8 to 10 inches and then give the tractor about 8 miles an hour. You'll turn up clods that will hold the soil in a blow and the trash that is left on top of the ground will help build up the moisture."

A good inch of rain . . . the best way to start the day in Texas . . . or anywhere.

FARMING to beat the drouth

By Grant Cannon and Fred Knoop

IN THE MIDST of the drouth, when dust and dry winds swirl across the Great Plains and every week adds to the list of counties in the disaster areas, some farmers beat the winds and scant moisture and raise a crop. When the rains come in cloudbursts and the flash-flooded rivers are heavy with silt, these same farmers hold onto their top soil and sponge up the rain to be used later.

With the drouth area stretching from Missouri to Arizona and from Texas to Montana, soil and crop conditions call for somewhat different farming practices for each section by these outstanding farmers. Each attacks the drouth in his own way, but they all want to improve the fertility of their soil; to keep it open so that the rain seeps in and stays, without crumbling it to a powder ready to fly with the wind; and to grow the crops which make a profit under dry conditions. In areas where nature is more forgiving and more generous with rain, good farmers have these same objectives and may even be able to use some of the same techniques these drouth-ridden farmers have perfected.

Here are the stories of eight of these successful farmers. They were chosen because they are specialists in their fields. One of them follows a multiple cropping program with cash crops and legumes to build the soil tilth. A second uses machinery to open the soil without covering the trash, in order to fight the winds and to welcome the rain. A third, who claims it is so dry in his part of the country that even the irrigation water contains only 30 per cent moisture, has used land leveling to put more land under irrigation and to stretch his shrunken water supply. A group of neighbors on the fringe of the corn belt have shifted from corn to less thirsty crops. And, finally, some farmers have fought the drouth with heavier and deeper applications of fertilizer down in the moist subsoil to grow an even bigger crop than they did before the dry years.

Each one of these farming methods has been tried and proved in the tough dry years. As individual farm practices they turned out to be good weapons, but farmers who have emphasized one of them have not overlooked the others. Combining them where that is possible has added to the scope of their fight against the drouth and cloudbursts, when they come.

Quadruple Cropping To Build Soil

"If I knew a farmer around here that didn't plant vetch, I'd be tempted to scatter him some seed in the night and then let the volunteers keep him in business after that," said E J Lee, who farms 480 acres along the banks of the Red River in Clay County, Texas. Lee, who has a personal feeling toward vetch that is like the attachment a dairyman feels for his high producing cow, welcomes visitors to his farm with the statement, "This is the house that vetch built—and here is a farm that vetch rebuilt."

Vetch and other legumes, he points out, made it possible for him to make a respectable crop of cotton and wheat last

E J LEE

. . . of Texas

"Between legumes and cash crops we never let the land go uncovered."

Legumes supply all his nitrogen; potash is plentiful. Once every three years he plows down 200 pounds of superphosphate.

Vetch is his standby legume. It paid for his home; it rebuilt his land.

In the fall he plants vetch and oats together. Another fall planting is wheat and vetch. In the spring he harvests the oats and wheat and plows down the vetch. In the summer the same land goes into cotton.

In the fall at second cotton picking time he plants winter peas or vetch between the rows . . . for winter cover.

With this four crop system and a plow-down of vetch, Lee has been able to improve his soil fertility yet double his yield. Cotton is his cash income crop. His vetch and winter oats make good winter pasture for his 60 Hereford cows and their calves.

JOHN GARRETT

. . . of New Mexico

"We haven't had a blow around here that I couldn't stop with our machines."

The machines are big Krause and Graham-Hoeme chisel plows, 30 feet wide, pulled by the biggest wheel tractors.

Every year about half of his land goes into wheat; that is 7000 acres. The other half lies fallow, storing up moisture. Rod weeders and sweeps keep the moisture-stealing weeds from getting a start in the fallow ground.

No turning plows go on the land. Chisels of all shapes and sizes make the seedbed. They can be put to work any time the wind starts to blow, to bring up clods from 15 inches down.

As drouth insurance Garrett has drilled three big wells for surface irrigation of wheat and grain sorghums. The water will be carried underground in pipes until it reaches the field that is to be irrigated; this keeps down evaporation loss, which is high in open ditches.

CLARENCE SVEDMAN

. . . of Colorado

"In dry years even the irrigation water only has 30 per cent moisture."

With 500 acres of irrigated farmland and 500 acres of dry land he has had to devise methods for two kinds of farming.

With land leveling (cost $50 an acre) he has stretched his irrigation water by a third, cut labor costs in half, and stopped furrow erosion.

To fight the 70-mile winter winds on his dry land he strip-crops his wheat in 15-rod bands with fallow land between.

To work the soil he uses chisel type plows and leaves the mulch on top of the ground.

To keep weeds from squandering the moisture he sprays fallow land with 2,4-D, once in the late summer. Svedman feels this is the fastest way, and least disturbing to the good grass cover on the fallow land.

IN 5 DRY STATES THESE MEN HAVE

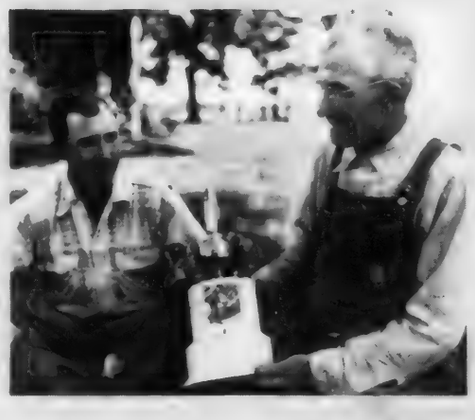
year when it was so dry many parts of the country had to call for government help to pull them through. And when the wettest October in history hit the farm with great gully-washers, his soil, which was conditioned and covered by legumes, blotted up the moisture and stayed put.

"With allotments like they are, a man can't have a real pattern of planting. On the two hundred acres of land I own we have an allotment of fourteen and a half acres of cotton and thirty-two acres of wheat. I also operate my sister's farm, which is the same size as mine, and rent eighty acres more. I try to follow a rotation of oats, cotton, and wheat, but with different allotments on the crops, you have to juggle around a good deal."

In the fall of the year, in late September or October, Lee, who looks like a Texan should look—lean as a cowboy, chipper as an oil man—plants part of his land to oats and vetch, 15 pounds of each to the acre. The vetch is more winter hardy than the oats but less so than wheat, but, if it gets a good start, he can pasture it all winter with his herd of 60 Hereford cows. In late February he takes the cattle off the land and lets the oats grow to the milk stage. He harvests the oats, and some of the vetch which has spiraled up the oat stems, for hay; this is his first crop off the land, a ton and a half of good feed. Early in June, he turns under the vetch that looks like a tangled field of purple sweet peas. Occasionally during the plowing, he stops to examine the short but matted roots with their nitrogen filled nodules which look like clusters of pale ant eggs; this is his second crop—a deposit in the soil bank. (See cover picture.) Around the middle of June or a little later he plants his cotton on this same land.

"This is my time to plant cotton. It's a short growing crop and planting it late, I'll save one cultivation" he said, then grinned. "Some years, of course, I'll even save a picking!"

In spite of his joking, Lee gets both pickings of this third crop, one in September and the other before the middle of



GEORGE YOUNG, ALBERT MACY

. . . of Kansas

"Corn was too thirsty. It took a dryland crop and special drills to lift the mortgages around here."

Research in Western Kansas has developed new varieties of milo, maize, or grain sorghum (the name may be different, but the crop is the same) a crop that goes in the two year rotation with wheat. Midland and Westland are two popular grain sorghum varieties.

For planting milo the soil is chiseled in the spring and left cloddy. Special drills plant the seed thin and shallow (¾ inch deep). Spring-loaded press wheels set the soil firmly around the seed.

No fertilizer is needed or used. The short ingredient is water and everything is done to conserve it. Only one cultivation is given the milo field, to avoid evaporation loss. Every cultivation will lose the equivalent of one inch of rainfall.

Milo is a crop that seems to know how to fight a drouth. When the weather gets dry it just sits and waits it out. Unlike corn it doesn't have the critical period at tasseling time when lack of rain will ruin a crop. The new varieties of grain sorghums don't lodge badly in the fall. They can be harvested up to the time the snow flies with a grain combine on which a few adjustments have been made.

SILAS McCUBBIN

CLYDE and JOHN FINLAY

. . . of Missouri

"When the hot wind blew at 113 degrees at tasseling time they called the contest off."

On two Missouri farms these men used the recommendations of George E. Smith and D. D. Smith of the University of Missouri. They say, "To ride out a drouth year, put your fertilizer in deep and heavy, so the corn will reach down into the subsoil for the fertilizer and moisture."

In 1953 McCubbin plowed 100 pounds of nitrogen, 80 pounds of phosphorus and 120 pounds of potash on his corn fields and averaged 127 bushels. In '54, the second year of the drouth, the dry winds cut him down. John Finlay and his son Clyde, who farm 15 miles away, proved that the heavy fertilization will carry corn through even a second year of drouth if you have protection from the wind. In a field, sheltered on three sides, they set the unofficial record in '54 with 102 bushels to the acre.

Corn that has been given enough fertilizer, placed 8 or 10 inches deep, is more than 10 times as efficient in its use of water, as corn that has to shift for itself. The roots don't crowd each other on the surface of the ground. If they are spread out on top of the ground they may get chopped off when the cultivator sweeps go down the row.

DISCOVERED HOW TO BEAT THE DROUTH

October. Between pickings, he plants his fourth crop between the cotton rows. This fourth crop may be winter peas or, more likely, his favorite, vetch, for pasture over the winter.

"This cover crop gives me pasture, improves the land, and keeps the soil from washing or blowing. And it does blow around here," he said glancing at the sheet-metal door of the cyclone cellar next to the house.

Many wheat farmers would consider Lee a likely candidate for the daffy ward if they saw him planting his wheat. Right after cotton picking he sows his wheat and with the 60 to 80 pounds of wheat to the acre he adds 10 pounds of vetch. He plants the late maturing Comanche wheat so that the wheat and vetch will be ready for harvest at the same time. While most farmers consider vetch about as desirable as onions in their wheat, Lee claims that it pays off. "The vetch seed," he said, "pays for the cleaning costs of the wheat and I get a bigger yield of wheat with vetch than without."

If there is enough moisture in the ground after wheat harvest, Lee plows under the stubble and plants a summer legume such as Chinese red peas or the new crop, guar. Guar is an import from India which is proving to be valuable in the Southwest for soil conditioning, cash beans, and feed. The guar bean is pressed to extract its vegetable gum and the crushed bean is an excellent protein supplement for cattle. In September, the legume is plowed under and the land goes back to vetch and oats. Once every three years, he plows down 200 pounds of superphosphate; legumes supply all his nitrogen and there is plenty of potash in the soil.

To farmers who think that the wheat-vetch combination is a little mad, Lee points to his own experience. "In 1945 we first planted vetch with our wheat. We had a pretty poor wheat year and only got around eight bushels to the acre. We rented a hand separator from the Soil Conservation District and my wife and I separated the whole crop by hand. The

On Clarence Svedman's mile-high farm near Fort Collins, Colorado, a rain like this one looks close. "When these boots are wet enough to stop squeaking I'll say it has rained here," says Svedman. His well-chiseled, trash-covered ground is all set to catch and hold every drop.

wheat paid for working the land and harvesting and we got around four hundred pounds of vetch seed to the acre. Vetch was just coming in around here and the seed brought twenty dollars a hundred which paid for all the materials for the house which we built ourselves."

And what has vetch done for the farm? When **E J** (the initials do not stand for names, they *are* his name) and Beryl Lee were married in 1939 and moved to the farm which he had inherited from his grandfather, he had $20 which had to cover the marriage license and set up housekeeping. Old-timers told him they could remember way back when the farm tenants produced a bale of cotton to the acre, but the cotton-corn rotation with all trash burned off the land had brought the yield to practically zero when he took over. They had to take off cash crops while they built the fertility of the soil and they had to hold down the eroded soil that remained while they built terraces. Legumes did both jobs.

By 1951, the Lee farm began to attract attention for good soil management. In that year he won his first Bridwell award for the best winter peas in Clay County. The awards, which are sponsored by the Wichita Falls Chamber of Commerce and Joe Bridwell, an oil man and rancher with a passion for conserving the soil, are given each year for individual soil conservation practices and for the best overall job in Clay, Wichita, and Archer Counties. In 1952 and 1953, Lee again won awards for individual conservation practices and in 1954 he was awarded the prize for the best overall job in the county.

Conserving the soil is important, but a farmer must mine it too if he is to make a living. In addition to his plaques and cash prizes for conservation, Lee has been producing outstanding crops. Last year, the cotton ginner who buys cotton from Lee and some 125 other farmers, offered his annual prize of a pair of boots to the man who sold him the most cotton. Though Lee's acreage allotments put him in the lower half of the farmers trying for this prize, he now wears a handsome pair of hand-made, calfskin cowboy boots with walking heel, outside straps, and five rows of green and yellow stitching in a flame design which would have cost him around $80. "They aren't insured," he says. "Usually a half bale to the acre isn't too much to brag about, but last year it was. And we only made a crop because our soil was rich and was holding every bit of moisture. I figure that I could take any farm in this area that wasn't following such a system and double the yield by turning to legumes. I know it is profitable both as a landowner and as a tenant because I'm both, and I practice the same system on the rented land that I do on my own."

One thing that would improve his system, Lee feels, would be to discard his turning plow and use only a chisel type plow. "The tractors I'm using aren't powerful enough to pull a chisel type plow, I'm afraid, and the farm just isn't big enough to support much bigger power equipment. But I'm sure that this kind of cultivating would be a big improvement over the way I'm plowing."

Machines that Save the Soil

A man who uses the kind of equipment

Lee dreams about is John Garrett who farms 22 sections of wheat land near Clovis, New Mexico. With some of the worst dust storms in the memory of man darkening the skies along the Texas-New Mexico border, Garrett is still willing to say, "We haven't had a blow around here that I couldn't stop with our machines."

Headquarters for this big spread is Garrett's home which is about five miles north of Clovis. "You can't miss it," Garrett said bruskly, "just look for a brick house with a circular driveway and about a quarter of a million dollars worth of junk in the yard."

Part of this "junk" are his tools for fighting the drouth. Lined up beside the fence, along with five self-propelled combines and a small flock of tractors, are his land working tools. He has not held to any one make or design, but almost all of them are tools which will open the land or weed it without disturbing the surface trash. His favorite piece of equipment is the 30 foot Graham-Hoeme plow which chisels the land to a depth of 12 to 18 inches, opening up the soil, but leaving the stubble on top. In a shed he has great stacks of sweeps to be fastened to the curved chisel blades for undercutting weeds. He also operates Krause plows which do a similar job. Other tools which Garrett uses for attacking the water-stealing weeds are the rod weeder, a square turning rod which is dragged through the soil a couple of inches below the surface; great, V shaped, sweeping Noble blades which slice off the weeds at the root; and a straight heavy blade some 12 feet long which Garrett had made to be attached to the Graham-Hoeme chassis.

Garrett agrees with William Graham, the manufacturer of the Graham-Hoeme plow (100 miles away in wind-blown Amarillo), who believes that turning plows tend to powder the soil, making it vulnerable to the wind and subject to puddling rather than drinking in the rain. Graham, who speaks with religious fervor about working the soil, says, "I've taken the attitude that God Almighty does things right. The best soil we have is where all the dying vegetation stays on top and where cracks open up in the soil during a drouth to let in the water. We have tried to design a tool that opens up the soil and still leaves stalks and trash on the surface to protect it from raindrop erosion, wind, and washing."

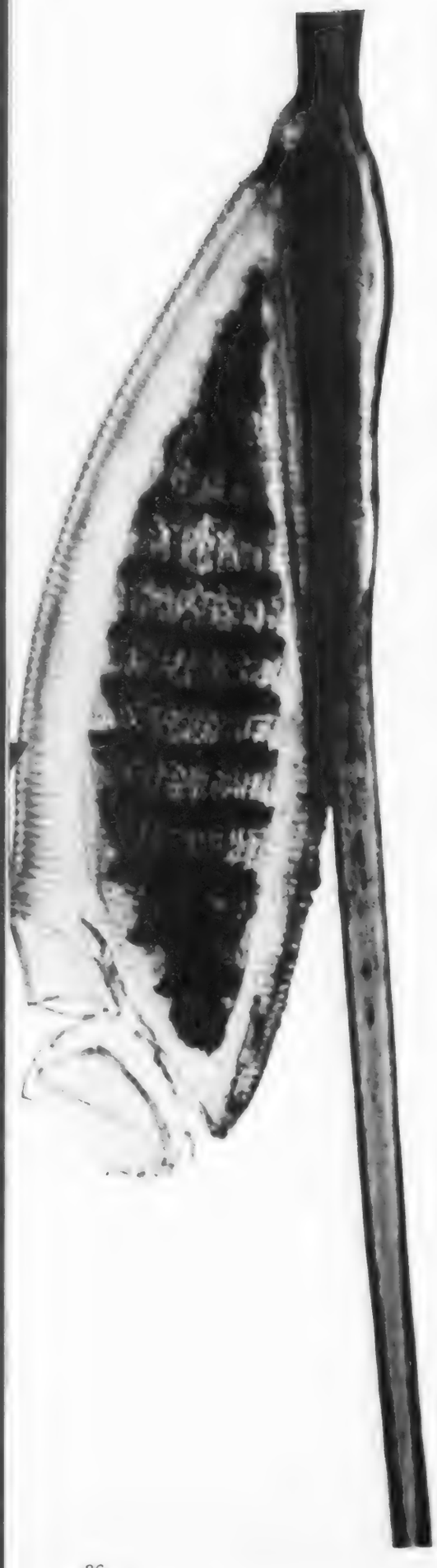
Farmers in the wheat country have found that when the winds come it is the clean, level land that lets go and starts to blow, piling up against the fences, burying posts and wire and turning the sun red as the dust travels with the wind.

"Pretty farming isn't for this part of the country," Garrett said. "We leave the ground rough and covered with stubble and even then we have to be ready to go out and work the land at the first sign of blowing. If we see soil blowing we go out with the Grahams with the big chisels from the old John Deere drag fastened to them and go over the land, rolling up as many clods as we can." Since he must be ready for anything Garrett is constantly inspecting the land, torturing his car as he drives over the rough fields.

Because of acreage allotments, not all of the 14,000 acres over which Garrett drives is in wheat. This year he will plant

(*Continued on page* 90)

Here's a hawk's eye look at soil conservation, farming that will weather the drouth, and soak up the heavy rains when they do come. From the bottom of the picture, reading northwest, you can see: terracing, contour plowing and strip-cropping. And notice the man in the upper left corner, out on the tractor, chiseling the field to hold the soil against the wind. Also note that the farmer just across the road to the north doesn't believe in these practices; he has plowed it straight. It's easier that way, but his field may take off and fly north to Canada.



WORMS

By R. J. McGinnis

An old-time veterinarian has some advice on getting rid of these unwelcome guests

Pop Ansen is an old man, nearing eighty. He had been a veterinarian before he retired to his farm and everybody around here goes to him with their animal troubles when they want help. I asked him about worms.

"Worms!" he shouted, in his high, thin voice. "I've fought worms in my livestock all my life, and I haven't got much better than a draw. I'm an old man and they're going to get me, personally, before long.

"I suppose," he continued, "you want to know about the worm parasites that get into the digestive system of an animal —worms that you can see if you have a sharp eye. There are other parasites that you can't see unless you get them under a microscope. The worm specialists call them protozoa. I don't know very much about them. But about plain, ordinary worms I know a little something. When I was a student at the old Cornell Vet school, we called the flat worms trematodes and tapeworms and the roundworms we called nematodes.

"I always figured that there's no point in feeding a belly-full of worms. An animal with a big cargo of worms aboard won't do well. It fattens slowly, it gets run down and is a sitting duck for some other disease, and the carcass is likely to be down graded in the packing plant. One of those pencil boys down in Washington figured out that the average farmer every year raises one steer out of eight, one hog out of twelve, and one sheep out of four, for the worms. He may be light on those figures. I had a calf last year that turned up lighter by fifty pounds at six months than the others of the same age—the worms sucked his blood and ate his feed. One large roundworm will cut down the gain of a pig by a full pound before he is five months old."

The egg of the common bot fly, attached gracefully to a horse hair, is shown at the left. This one is magnified about 300 times. You'll find them on farm animal's legs during the summer months, where they look like pin-head size pieces of mud. If the animal licks its leg the egg hatches, the larvae attaches itself to the tongue and goes into the digestive system. Here it stays through the winter months. In the spring it passes out with the feces to start life over as a fly. Clipping the legs is an easy way to stop the life cycle.

While Pop drew a breath, I poked another question at him. "How do I know when an animal has worms?"

Pop gave me a sharp glance. "If I could answer that even half the time, I'd be a genius. You've got to have a sort of sixth sense about worms. You look at an animal, and you see this and that, and you say to yourself, 'That beast has worms.' You can't say just why you feel that way. One sure way to tell is to cut the animal open and examine him: but, of course, the animal's no longer any good to you. Another way is to take a manure test. If you stay here a few minutes more, we'll walk out to my shop and do that."

Pop Ansen on Hog Worms

My immediate problem, I told Pop, was wormy hogs. Encouraged by my deference to his age and learning, he gave me a brief lecture on that subject. "Hogs are plagued by a variety of worms," he said, "and the worst of the lot is the large intestinal roundworm or white worm. It is one of a large family called ascarids. Then there are the nodular worms, the hookworms, stomach worms, kidney worms, thornheaded worms, and lungworms."

Pop took a quart jar from a shelf and held it up to the light. I saw what looked to be short pieces of white thread floating around in water. "These are stomach worms," he said, "and the hog they came out of likely got them by eating beetles or bugs in the barnyard. Most worms get to the animal through the mouth, picked up from drinking water or from feed and pasture. The exception is the hookworm, which also gets in through the skin. Most worms pass part of their life cycle in the alimentary or respiratory tracts of the animal. They attach themselves to the walls of the digestive tract, and lay their eggs, which pass out with the manure or urine. The eggs hatch either on the ground or in a host like a flea, mite, bug, angleworm, or snail. and the larvae are then picked up by the animal. That's the infernal cycle. The job is to break that cycle at an important point—we should zig when the worm zags—throw him off his stride.

The flotation method of picking up worm eggs is shown at the left. The micro slide is allowed to lie on top of the glass, in contact with the solution for 5 minutes. Then it is lifted off, turned over, and placed under the microscope. An inexpensive microscope with 100- to 300-power magnification will show up the eggs, and they will look like those in the photographs below. The diagnosis as to the exact kind of worm eggs is more difficult. If you find eggs you have one clue as to what may be bothering an animal that is half-sick.

How to use a microscope to find worm eggs

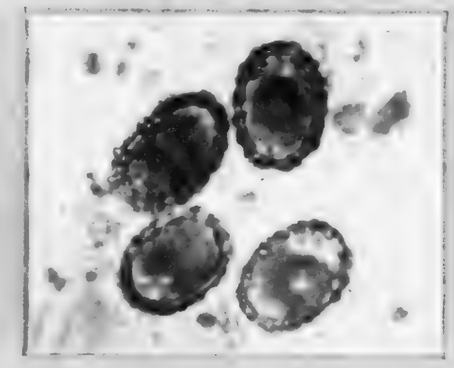
A farmer can satisfy himself about whether or not his livestock have worms with a $15 microscope (available from Edmund Scientific Corp., Barrington, New Jersey) and a little self-education. The way to take a fecal test is to first get a fresh sample of the feces, about a handful. Put as much sodium nitrate in a pint of water as will dissolve; mix feces with this solution until it's about the consistency of soup. Strain this through a cheesecloth to remove the debris; pour the strained mixture into a water glass; lay a microscope slide across the top of the glass. The glass should be level full so that the mixture will touch the under-surface of the slide. Leave it there five minutes, turn it over and examine it under the microscope. If you find no signs of parasites, repeat your test for three successive days.

This test will not usually work on tapeworms. You will have to rely on finding sections of worm in the feces. The eggs of tapeworms are usually enclosed within the tapeworm itself and seldom occur free in the feces. Often they adhere to the hair around the anus.

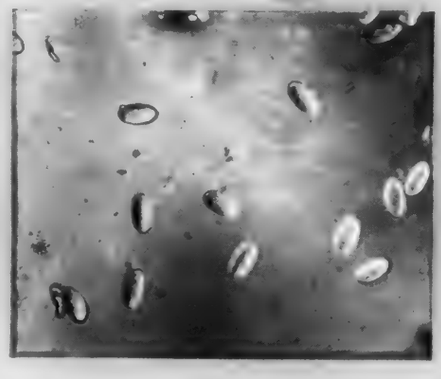
The average farmer will not have the training to make extremely accurate fecal tests. But he will be able to identify worm eggs and go on from that point and get advice from a veterinarian who will prescribe the right treatment.

A 300-power magnification of the egg of a strongylid, or stomach worm, found in sheep, cattle and goats. The life cycle of this worm, (Haemonchus contortus) is shown on page 38.

The egg of the common ascarid of swine (Ascaris lumbricoides) as seen under a miscroscope of about 300-power magnification. This worm is shown in a hog's intestines on page 39.



Another variety of stomach worm (strongylus rubidus). The eggs of this worm found in hogs, sheep and goats are all similar. It has a small egg, shown by this 300-power magnification.



"It's usually easy to spot a pig with worms, especially if they have been working on him for some time. His coat gets rough and thin, he'll lose weight, his eyes get bleary and his gums pale. In bad cases, little pigs will get thumps and paralysis. If your pigs are not gaining like they should, the first thing I would suspect is worms. Of course, a well-fed animal can carry along a good many freeloading worms before he shows it, but he has to eat double—once for himself and once for the worms, and in time they'll get him.

"I dose my pigs regularly. That's the only way to raise hogs. I don't mean I give them drugs the year 'round in their feed—but a drench or capsule at certain periods, or I mix the drug with feed. The drugs we give for worms are meant to kill—they are poisons—and the animal would be better off without them. They all have to be handled carefully. When you're not sure about the dosage or the drug, better ask your veterinarian. Don't wait for worms to turn up in shoats. They never fail. I worm all pigs a week before weaning. Worming just at weaning time gives them a double-barreled setback. That first worming usually cleans them up for the time being, but worms will get into an older animal. I keep my eye peeled for signs—segments in the manure or poor doing. As soon as I suspect worms, I make a fecal test. That's the only way to find out if the animal has worms; what kind he has and how many.

"If a fecal test shows an older pig has worms, I give him an extra dose of medicine for that particular worm. In the

meantime, I keep the farrowing pens clean, I rotate pastures so that the clean hogs won't be contaminated, and I wash the sows before they farrow. Worms like damp swampy places; I like a well-drained pasture that dries out under the sun in a hurry.

"The worm that will give you the biggest headache in your hogs is the large roundworm. You'll get quite a surprise if you happen to find one in a dropping—up to 12 inches long and as big as a lead pencil, and ugly. One of the best drugs for the large roundworm is sodium fluoride. You mix it with your dry ground feed, one per cent by weight, and give them that for one day. Don't fast them, but reduce their feed the day before. If they don't clean up the treated feed, mix the left-over with their regular ration the next day until they clean it up. Dose the pigs a week before weaning and again about two months later.

"A new series of drugs, called piperazines, have the worm people talking. They say they will do a good job on a good many worms. I'm hopeful for them and I'm going to give them a try.

"There's no drug that I know of that does a good job on the thorn-headed worm. The same can be said about the drugs for threadworms. And there's nothing that will touch lungworms and kidney worms. All you can do with them is to keep everything clean and pray for the animals to outlive the worm.

"Stomach worms should be treated with carbon disulfide, 2 to 2½ fluid drams (one-fourth ounce) to 100 pounds of live weight. Give it in capsules or by stomach tube. Its use is strictly a gamble. Sodium fluoride works against the thick stomach worm also, but this drug is tricky. We used to fast pigs 36 to 48 hours before we gave them carbon disulfide, but a lot of practical men don't believe this is necessary to do a good worming job.

"A lot of farmers call all worms 'stomach worms.' A stomach worm is a little fellow, hardly ever more than a fifth of an inch long, and hard to see. Looks a little like a piece of thread. Some are red.

"To my mind, phenothiazine should be used more for hogs. It's no better than sodium fluoride for ascarids, but it's better for nodular worms. I give it one gram (a dose the size of a big pea) for each 5 pounds of live weight for pigs weighing up to 50 pounds and one additional gram for each additional 10 pounds of weight, with a maximum dose of 30 grams. The careful use of phenothiazine will remove about 90 per cent of the nodular worms from a hog, but some hogs can't take phenothiazine. You've got to be prepared for a backfire. If a hog is allergic to phenothiazine, he might act paralyzed or go off feed. Phenothiazine is more toxic to some hogs than to others, which is the reason it isn't used more. Maybe someone will come up with a way to take the risk out of it.

"Hogs don't get tapeworms in the intestines, but they are hosts to a tapeworm which develops in the liver or muscles and matures in a man or cattle. Anyway, tapes are no problem in hogs.

"Flukes, lung and liver worms, which are quite a problem with cattle and sheep in some places, aren't important in hogs in this country. Even if we had them, we could not do very much about their control. We don't have a drug to do the job."

Pop Ansen on Worms in Cattle

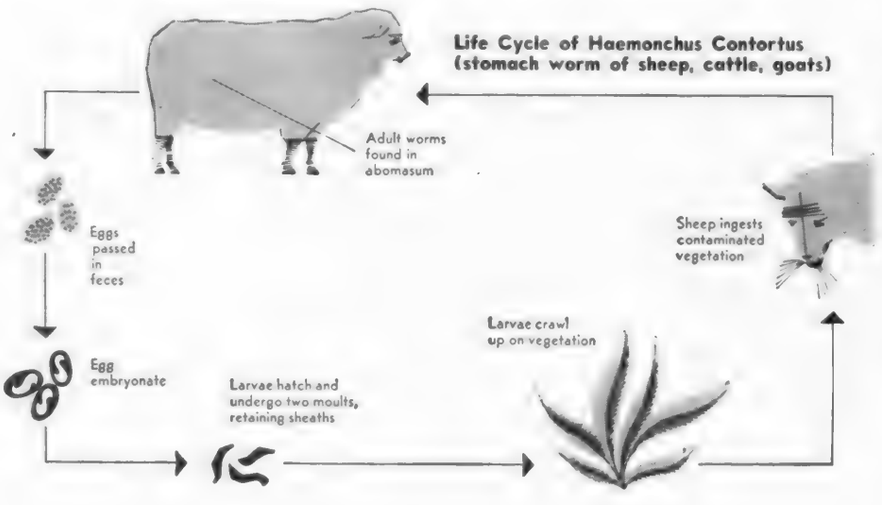
"If you have got a herd of well fed, sleek dairy cows," says Pop Ansen, "the chances are you won't have much trouble with worms. I'll go along with a fellow down at the Texas A. and M. Station, Dr. R. D. Turk, who says that too many farmers feed their worms drugs instead of feeding their cattle feed. The undernourished animal seems to be the worst off when it comes to worms.

"The most bothersome worms in cattle are the stomach worms and their relatives. Up in Washington and Oregon they are having a tough time with liver flukes, and in other places lungworms seems to be giving them trouble. Around here in the Midwest, stomach worms are common and cause the most trouble. There is no sure-shot drug that will get them all, but phenothiazine does a pretty good job on stomach worms and nodular worms. Like nodular worms in hogs, they penetrate the walls of the intestines and form little lumps or nodes. If I find these worms in my cattle, I give them a dose, 10 grams per hundred pounds of body weight. There is one tough member of that family of stomach worms—there is no common name for him, but he is known as ostertagia. If a veterinarian tells you that he is around, you will have to double the dose of phenothiazine, but don't give more than 60 grams. You can give phenothiazine in capsules, boluses, as a drench, or mixed with the feed.

"Young stock should be dosed before each grazing season and two doses are recommended about 21 days apart. Phenothiazine doesn't touch the immature worms and the second dose is to kill the young ones that have grown up since you gave the first dose, just like, in field work, the second shot of 2,4-D kills the wild onions whose bulbs hadn't sprouted in time to be hurt by the first shot.

"If you are going to use phenothiazine in feed, give it at the rate of 0.5 grams daily per 100 lbs. of body weight to a maximum of 2.5 grams per adult animal per day, thoroughly mixed.

"The standard way of obtaining this is to mix the phenothiazine in a ground feed,


Life Cycle of Haemonchus Contortus
(stomach worm of sheep, cattle, goats)
Adult worms found in abomasum
Eggs passed in feces
Egg embryonate
Larvae hatch and undergo two moults, retaining sheaths
Larvae crawl up on vegetation
Sheep ingests contaminated vegetation

In the photograph above the common stomach worm is shown, as big as life. He can cause all kinds of trouble. Young animals that are badly infested are weakened, and become a target for all kinds of disease. The life cycle of this pest is shown in the diagram (left) and the eggs, each capable of releasing hundreds of worms, are shown on page 37.

such as a mixed dairy feed or soybean oil meal. One gram of phenothiazine is mixed in each pound of feed (4.5 pounds per ton). One pound of this mixture is fed daily to animals weighing 200 pounds, 1.5 pounds to animals weighing 300 pounds, 2 pounds to animals weighing 400 pounds, and 2.4 pounds to animals weighing 500 pounds or more. The feeding of phenothiazine to cattle in the salt is not for me. They eat salt irregularly and unpredictably. Some lick off a lot, some very little. On the range, there may be no better way.

"To go after tapes, a dose of lead arsenate, 0.5 to 1.0 gram, depending on size, will do a good job.

"If your cattle go gaunt, get snotty noses, and pale gums, they might have lungworms. You can't do very much about it except rotate your pasture, don't let them out when the grass is wet or when the dew is on, and if you have a really bad case, put him in the barn and give him a rest; and watch out for pneumonia.

"Up in the Pacific northwest and some places in the south where liver flukes have become a problem, they are using hexachloroethane. They give it as a drench, half water by weight. The dose for big animals is 200 cc. and for calves about 100 cc., easily portioned out from a vet's measured bottle. Cattle should be given this treatment in the spring and again in the fall."

I volunteered the information, which Pop already knew, that farmers around here in the Midwest didn't seem to worry much about worms in their cattle.

"Well," he replied, "you're right. They treat their hogs and sheep and pass up cattle. That's because worms seldom cause serious loss in meat or milk unless the cattle are damaged when they are young. We often lay worm damage to something

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Liver flukes (above) look harmless enough, but they are often the cause of animals "doing poorly" when they are grazed on swampy pastures. The section of a hog's intestine (left) disclosed why he didn't make a good gain, even though he ate all the time. These are ascarids, and they could have been eliminated by the right treatment when he was younger.

Liability Insurance for Farmers

By Barney McMackin

RECENTLY A Nebraska farmer's young son set fire to a chicken's tail feathers. The chicken made a beeline for the barn. The barn went up in flames and the fire jumped to the house. A neighbor who was helping fight the fire was pinned beneath the timbers of a wall when the house collapsed. The farmer's spirits—already worse than dampened—hit a record low when he received a call from a lawyer several days later informing him that his neighbor was suing: he had lost an eye.

The story is not typical, but farmers are finding themselves in (or near) court for one reason or another far more frequently than ever in the past. They are on the defense end of law suits more and more these days because successful farms are prosperous, busy places, largely mechanized and easily accessible. Today's farm is no tight, little island, seldom visited and

seldom left, as it was in grandfather's day. For business or pleasure, dozens of people find their way onto farm premises every week, and for pleasure or business, farm folks range miles from home. This means contact, and whether it is contact of man with man, man with beast, or man with thing—there will come injury or damage, as well as the better things. And where there is damage or injury to either a person or his property there is likely to be a lawyer hanging around in the shadows with a liability suit on his mind.

Farmers long ago learned to trade off the potential loss of their farm buildings by fire, flood, or storm for a set and definite amount of money—an insurance premium. Handing over the deed to the farm in satisfaction of a liability judgment isn't much different from watching the place burn, except that it is somehow more painful. This type of misfortune can be traded off, too—by buying liability insurance.

Farmers are familiar with liability in one form or another. Most of them own at least one car or truck and have liability coverage on these vehicles. There are, however, many farmers who do not have protection against possible liability growing out of the farm itself, farming operation, farm equipment and livestock, and personal activities.

Liability insurance, basically, is an agreement on the part of the insurance company to pay whatever the farmer would otherwise be liable for as a result of negligence resulting in personal injury to another or damage to another's property. Functionally, it goes much further. When somebody is hurt, or his property is damaged as a result of another's negligence, the usual thing for the injured party to do is to look to the responsible person for payment. Most often, he does this through a lawyer, usually with the announced intention of suing, if necessary.

Obviously, the negligent or allegedly negligent party needs a lawyer, too. More, he needs the services of people who have experience and skill with this kind of trouble—people who know how to get all of the facts in perspective and how to evaluate the situation in terms of the law, the courts, and the best interests of their clients. There is also the matter of bail bonds or appeal bonds, which are expensive. Liability insurance includes all of these features and absorbs such expense over and above the limits of coverage.

This does not mean there has to be a legal wrangle before the insurance company writes a check. In practice, comparatively few liability claims have to be taken through the unpleasantness of a court fight. If there is little doubt that the policyholder is liable and the demands of the injured party are realistic, the whole business is settled long before there is any necessity for ruffled feathers. However, where the claimant is obviously entitled to nothing, the insurance company usually has to fight all the way. There are two reasons for this: (1) If the company consistently paid "all comers" and its prices (rates) were fair, it would be broke in no time, with unfortunate results for other policyholders who were relying upon its solvency. (2) It would be compromising the integrity of the policyholder against whom the claim was made by apparently admitting his fault.

There is a border area, of course, between legal obligation and what the policyholder deems his moral obligation. If a visitor slips on your steps and breaks his leg, it does not necessarily follow that you are liable at law for his doctor bills. He may have been the negligent party. But most hosts feel a sort of gracious duty to pay such bills. Most liability policies may be written with an extra feature, called medical payments insurance, which takes care of situations like this, paying doctor and hospital bills *whether or not* the insured is actually liable.

The Farmer's Liability

A farmer has the obligation, backed by law, of maintaining the farm itself—the house, barn, and other buildings, roads, walks, even his fields—in a safe condition. Two years ago, a Texas rancher was sued by the parents of a child who drowned in a dipping vat. The rancher, who was sued on the grounds that the vat was an "attractive nuisance," won in the lower court, but the state supreme court reversed that judgment and sent it back for another trial. There is no record that it ever reached the courts the second time, so it was probably settled "on the courthouse steps."

The attractive nuisance has been a snare for many an unsuspecting farmer. The law is hesitant about pinning it down, but it is anything which tempts the adventurous child to risk his life and limb. It may be a pond, a tunnel in the hay mow, an apple tree, or a rusty old machine in the barnyard. Children being children, the farmer is responsible for injuries incurred from an attractive nuisance.

The routine, day-by-day work on a farm is the greatest source of liability, and little wonder. Put a barnyard full of machinery, a tall barn, numerous animals, and the unpredictable human equation together and you have what is commonly called a pregnant situation.

A farmer asked a neighbor to cut some wood, using his (the farmer's) power saw. The neighbor's hand was pulled into the machine and he sued. Despite his own testimony that he did not consider the absence of guards a defect and that he had operated the same saw for three winters, he got a substantial judgment against the farmer.

A defective tractor clutch caused an Iowa farmhand some concern, but on the promise of his employer that it would be fixed as soon as possible if he would just go on with his plowing, he stuck with it. The tractor later pinned him against some other machinery, seriously injuring his leg. The farmer's position in this case was obviously weak.

Farm brutes, by their very animal na-

Here are two types of liabilities that could bring a farmer into court and cost him money. An attractive nuisance (opposite page) is an open well, an invitation to children. Neither the wall nor a tight cover protects the farmer if someone falls in. A bull (below) may look gentle and be a beautiful animal, but he can be dangerous. An owner is liable even for injury to a trespasser. A sign, "Dangerous Bull" or "Vicious Dog" offers little recourse in court—a bull or a dog can't read. Negligence on the part of the farmer compounds damages.

Where there is machinery there is always the possibility of an accident. Here a broken rope endangers the life of a worker. Even if covered by state compensation insurance, the worker may sue the farmer if he thinks he can get more than his state insurance allows. Protection for this type of accident is relatively cheap. With it, a farmer can sleep nights.

ture, cause difficulties, as we all have seen. Bull goring cases abound, with juries almost always sympathetic to victims, *whether they be trespassers in the pasture or not.* In many states, the farmer is supposed to keep in repair his half of the fence line. If a bull charges through either half of the line, the bull's owner is responsible for the damage done. The animal need not be a rambunctious bull. Take the case of a Pennsylvania farmer who had a dozen sheep break out of their confines and into a neighbor's strawberry patch. The neighbor's wife chased the marauders, but the ram would not cooperate. Instead, he turned on the housewife and butted her. The only surprising thing about this case is that the lady got only $400 for her injuries, which dates the case as some years ago. Today she would likely have collected a tidy sum for "mental anguish."

In Wisconsin, a roan bull crashed a fence and serviced two registered Guernseys. There was a court hassle over the amount of damages, the final decision setsing them at the difference between the reasonable cash market value of the cows as purebred registered breeding stock immediately before, and their reasonable cash market after being serviced.

A Vermont employee who was unharnessing a horse at day's end carelessly let the animal escape. He made a few passes at corraling the animal, all unsuccessful, then gave up and went home. Later, the horse got on the highway, caused a collision, and the *employer* was held liable for the damage.

The culprit in a damage suit need not necessarily be alive and kicking. An Ohio farmer who sold several tons of hay to a neighbor had to pay for seven cows which died from poisoning.

The purely personal activities of the farmer and members of his family are also sources of liability. Whether it's some condition around the house, careless smoking, sports activities, social gatherings or the devious meanderings of children, a single unanticipated incident can bring on financial ruin for the farmer.

An Illinois farmer thought he saw the end of $27,000 when his youngster showed unusual prowess at the game of "Kick the Can." The can, in this instance, had a jagged edge which blinded a little girl who was in the game. A $27,000 judgment was returned against the parents of the kicker, but the case was subsequently knocked out in an appeals court. This case, by the way, is another excellent example of the defense costs coverage of liability insurance. Lawyers' fees in this legal donnybrook were stupendous.

The Farmer's Very Own Insurance

Many insurance companies have a relatively simple and uncomplicated single liability policy which covers practically all of the common sources of liability and which may be altered to meet specific needs which vary from the general run.

This contract, which is usually called the "farmers comprehensive personal liability policy," protects the farm family, including relatives who live with them, and any other person under the age of 21 who is in their care, against liability for injury or death arising from alleged negligence. The word, "comprehensive" in the title is important in insurance language, indicating a broad over-all type of protection as contrasted with a policy that offers protection only for specified liability. The latter method (referred to in the insurance business as "scheduled" protection) is seldom as satisfactory because it sometimes results in claims which are not insured because they fall in no man's land, where one coverage ends and the other takes up.

It is often wise for a farmer to buy a specific liability policy over and above his general comprehensive liability policy. Take the case of Milt Grosbeck, a Michigan mint farmer. His operation includes the processing of the mint as well as growing it. The processing involves the operation of a steam boiler, which might not be adequately covered in a general comprehensive policy. Grosbeck found that out by consulting his agent and going over his mint farm operation step-by-step. Accidents arising from boilers occur only once every blue moon, the agent said, but Grosbeck nevertheless thought he ought to have adequate protection. Specific coverage cost only a few dollars a year and Milt Grosbeck bought this extra coverage because he planned to be in the mint business for more than a blue moon and wanted to be safely insured.

It is easier to learn what a comprehensive contract does not cover than to itemize what protections it offers the owner. On buying a policy, it is wise to learn what is *not* included. Then you can decide if you need specific additional coverage. Essentially, most comprehensive policies cover any liability loss which they do not exclude. The layman usually has a derisive name for those features of an insurance policy which he finds in "the fine print." These gimmicks, which the companies call "limitations" and "exclusions," are necessary, they say, to insure a finite limit to the protection they sell.

For example, one of the clauses you will find in your policy under "Exclusions"

A visitor, a salesman, even a trespasser may bring a farmer into court if injured by a faulty step, a hole in a floor, or a rusty nail.

states: "Under coverage A (Property Damage Liability) to injury to or destruction of property used by, rented to or in the care, custody or control of the insured, or property as to which the insured for any purpose is exercising physical control." This exclusion protects the company, among other things, against the careless borrower. Suppose you borrow a hay rake from a neighbor. Because it isn't yours, you might be inclined to be careless and damage it. No company wants to place itself in a position of guaranteeing careful handling of property not owned by the insured. However, a limited coverage can be bought for $2.00 in addition to the regular cost of your policy.

Likewise, a comprehensive personal liability policy excludes coverage or liability for bodily injury caused *intentionally* by the insured (or at his direction). In the absence of this exclusion, an individual would be able to paste a sharp cattle trader in the mouth and let the insurance company pay his way out.

Comprehensive liability policies usually exclude liability arising out of the ownership, operation, maintenance or use, as well as loading or unloading of automobiles. Automobile liability insurance, as everyone knows who buys it, is no nominal item, and the cost of a farm liability policy would be much higher if this liability were included.

State Compensation Plus

Most states have workmen's compensation laws and farmers who pay a small per cent of their payroll into the state's workmen's compensation fund have already done something useful to cover their liability in the event an employee is hurt. But this does not protect the farmer in the event the workman feels his compensation for a serious farm injury is not sufficient and waives his workmen's compensation claim in order to sue his employer. At his pleasure, the workman may accept what is offered by workmen's compensation, or he may sue the farmer, whether or not the farmer bought state workmen's compensation. This is where the comprehensive personal liability covers the insured.

How to Buy Liability Insurance

Select an experienced farm insurance agent and give him exact details concerning the number and type of present employees, as well as your plans for the near future. Without such information, the farm liability policy may fall far short of the farmer's expectations.

Ask your insurance man to show you his comprehensive personal liability policy and be ready to give him at least an hour to go over it with you, so that he can explain it line by line. This will surprise him, because so few clients want to know the details. You'll find him delighted at an opportunity to get down to particulars and your understanding of this important part of your insurance protection will add considerably to your peace of mind.

This kind of an attractive nuisance on a farm is dynamite for the farmer and an invitation to every visiting boy—or the farmer's own for that matter—to climb, fall off, and break either his neck or his leg. Liability insurance takes the financial pain out of an accident.

Liability insurance for most farms is reasonable. In many states, the basic annual premium for the farmers comprehensive personal liability insurance is $10, and this provides coverage up to $10,000 per occurrence and $250 per person in medical payments. The highest is $20, in Connecticut. This takes care of a farm of five acres or less. If the farm has more than five acres, there are additional charges, ranging from $2 for an additional 80 acres to $57 for 10,000 acres.

There are various extra charges for special "off the farm" situations. For example, if the farmer's daughter is a teacher, her purely personal liability is covered without charge if she lives at home, but for protection against possible liability for spanking a pupil, the premium would be increased $1.50.

An attractive "extra" has been available generally since last May. This has the rather ponderous title, "Physical Dam-

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Hire an Electric FARMHAND

By Robert Battin

FEEDING cows and cleaning barns are tough jobs that for years seemed to defy, or at least escape the attention of the mechanical geniuses who have been able to rig up all sorts of contrivances to speed up field work. Now we have silo unloaders, barn cleaners and home feed mills which lift a big load off the farmer's back and cut a big hunk out of his chore time.

Here we are going to give some figures on their cost and set up some formulas to help a man determine what they might be worth on his farm. Barn workers will be interested in comparisons that show how field work has become more and more productive while barn work lagged. Fortunately, for the last forty years, ag students and teachers at Cornell University kept records on a thousand dairy farmers.

In 1914 a dairyman working the usual 10 hours a day got 45 pounds of milk for every hour he worked. Today, his grandson gets 101 pounds of milk for the same hour. Grandpa worked 153 hours a year to care for each cow in the barn; his grandson needs 104 hours for the same job. That gain in milk and time sounds good until we see how field work production has improved in the same forty years. Wheat production per hour of labor has gone up from one bushel to 4.5 while the hours required per acre in the wheat field dropped from 22 to 9.

Corn yield, with a big assist from hybrid strains, zoomed 1000 per cent for every hour of work in the cornfield. In bushels that is an increase from .53 to 5.3. At the same time the labor needed to grow an acre of corn slid from 70 hours to 10, down 86 per cent.

Field time to grow an acre of oats has fallen from 19 to 7 hours, a drop of 63 per cent.

The point is that the man in the dairy barn, even in a good dairy state like New York, just hasn't kept pace with his partner in the field in productivity, and this shows up in a most distressing place—the bank account. In 1953 the *average* dairy farmer in eastern Wisconsin got a return of only 59 cents an hour for his labor after all other charges of his farming operations had been deducted from his income. Dairymen in the central northwest made 49 cents an hour. These same men were paying their hired labor 95 cents to $1 per hour. Whose fault is this low return to the dairyman? One hour of his time will put 5 bushels of corn in his crib; yet the same hour spent on cows puts 101 pounds of milk in the cooler. Same man; same muscle, yet a cash difference in many parts of the country of $1 an hour against milk.

What's the reason for this? Simply that the man who grows the corn turns his ground with a four bottom plow, finishes his seedbed in one operation with a tandem hitched disc and harrow, plants his seed with a four row planter, picks it with a self-propelled picker and lifts it into the crib with a power driven elevator. Many a man is still pitching silage with a fork and cleaning up with a shovel.

H. H. Case and his son Alden, who farm near Janesville, Wisconsin, watch their herd of 50 milkers clean up silage. It takes 8 minutes for the mechanical feeder to put out enough silage for the herd, against one hour by hand. Case feeds silage once a day, outdoors, all the year 'round. Says Case, "Cows will eat poorer quality feed outdoors in the fresh air than inside. If you have some silage that didn't cure quite right they'll sail right into it if you put it in a bunk. We figure half-an-hour outside won't hurt any cow."

The mechanical feeder works like this: on the "out" stroke the paddles put out their arms and push; on the "in" stroke the paddles fold back. The shuttle motion carries the feed all the way out to the end of the bunk.

Help Is On The Way

Barn chores have been the roadblock to profits in dairying. Now these blocks are being quietly removed by the application of machinery. Take a fellow like Lyman McKee, just outside of Madison, Wisconsin. Lyman and his brother Bill poured 1,387,000 pounds of milk onto the market last year with the help of 135 cows in stanchions. Electric silo unloaders, gutter cleaners and a home feed mill cut their chore time, manpower requirements and costs.

The McKees nominate their barn cleaners as their first choice in labor-saving equipment. "They not only pay for themselves," says Lyman, "but next to our milking machines they are the most important pieces of equipment in our dairy operation. When you have as many cows as we do in three separate barns, cleaning by hand twice a day is a hard, dirty job."

Next to the barn cleaners, the McKees favor their electric silo unloader. This piece of equipment reduces a daily two-hour job to the simple process of pushing a button. There is no climbing up the tower, no back-breaking forking out of stubborn, heavy silage. And an added advantage is that the silage comes down the chute rechopped and mixed so that the cows seem to find it much more palatable than the wadded stuff forked out by hand.

The McKees' feed mill is a big grinder and a one-ton mixing hopper alongside the corn cribs and grain bins. The McKees admit this piece of equipment saves only a penny or two per hundred on their grinding and mixing costs, but more important than this is the time it saves. "Before we got the feed plant," Lyman says, "we would go to town about eight in the morning with a load of corn and grain and by the time we got back it was four in the afternoon. That is, if we didn't have to wait too long at the mill. Now we can do the same job in a few hours. Actually we grind three days a week for three or four hours. That takes care of all our cows, eight hundred chickens, forty sows, one hundred and fifty fall pigs and three hundred and seventy-five little pigs."

All of which sounds fine: so one is prepared to hear McKee say that he and his brother have laid off one of their hands. But that isn't the case. "Anybody who knows farming knows that you don't put in a lot of equipment like that and then start laying off help," says Lyman. "Actually, we are able to handle more cows. Also, the extra time you get from the use of this stuff just gives a fellow a chance to catch up on all those other jobs that are always waiting in line—painting, mending fences, repairing machinery. And don't think these cleaners and unloaders and such don't take plenty of attention. The workshop becomes the center of the farm when a man gets his place mechanized as much as ours. But, the end result is that because we're spending less time per cow, we have the time to keep buildings and equipment in better condition. That pays off,too."

The Unloader

Silo unloaders and barn cleaners are nothing new on American farms. They are a lot more dependable and efficient, though, than when they were introduced some years back. Unloaders are made to handle any crop the farmer may want to put in the silo. They are usually a single or double boom to which are attached discs, blades or an auger arrangement to cut the silage loose and push it to the center where it is picked up by a blower or impeller and thrown down the chute. The discs and augers do a better job of cutting out grass silage and frozen corn than do the blades. Some machines are suspended from the top of the silo and are lowered onto the silage by a cable and winch controlled from the base of the silo. Some have no top suspension and rest entirely on the surface of the silage. Power is provided by a three- or five-horsepower electric motor. Some models are equipped with a time switch which automatically cuts off the motor when enough silage for a feeding has been thrown down. The unloader occupies about one ring of the silo.

One of the minor problems with the unloader is getting the thing back into position at the top of the silo after the tower has been emptied. Some farmers crank it up with the same winch used

Just Throw the Switch

"Have you ever come in from the field after a dusty day of baling, climbed rung after rung, door after door, to the top of a fifty foot silo and dug out silage for forty cows?" That's Oscar Lippens speaking. And Oscar feeds silage all year 'round.

"But I wouldn't be feeding it in the summer if I didn't have a silo unloader," continues this Prophetstown, Illinois, dairyman. "I just walk in the shed, throw the switch, give the winch a turn to bring the unloader down onto the silage, and down it comes fluffy and fresh, just as fast as I can wheel it out to the cows.

"Some evenings I have to work an extra hour at Dad's place; then my wife can throw that switch as easy as I can and get the chores done right on schedule. To clean up, all she does is start the gutter cleaner and in another ten minutes the place is ready for the milk inspector—and no backaches."

The Lippens family, Mr. and Mrs. and 7 year-old Roger, moved on their 240 acre farm in 1952. With no other help than an occasional assist from Oscar's dad, they have completely remodeled the barn, reclaimed 60 acres of former swampland and made it into a highly productive corn field and built up a first class herd of Holsteins, besides all the other jobs that go with a farm of that size.

Oscar admits he got discouraged at times, and last winter he found himself faced with a dilemma. "Barn work was taking too much time," he says, "it was either hire a man or get some of this equipment. But where are you going to find a good farm hand these days? We decided to get the equipment.

"I drove out to the factory in my truck to pick it up. That was an experience in itself. Not my trip to the plant, but the work Irene and Dad had to do while I was gone. It was one of the few times I ever missed a milking. Irene and Dad put in three hours feeding silage and cleaning the barn. It was more than they could have stood for any length of time.

"Dad and I installed the stuff ourselves. It cost $2,350, but of course we saved a lot by doing our own installing. It sure was nice when it got going. You'd just walk in the barn in the morning, throw the switch on the cleaner and in a few minutes you were ready to milk.

"I figure this equipment the same as a tractor. It saves me three hours a day. That's what I have a tractor for, too, isn't it?

"I have time to enjoy myself once in a while. We've never had the yard looking as nice as it is now. Maybe we'll even take a little vacation trip before the year's out."

to control its descent, jacking it up a few turns every day during the off season. Others take the machine apart, pull it up the chute in five or six pieces and reassemble it at the top after the silo has been refilled. Farmers, who use the same unloader in two silos, generally follow this procedure. The Davy Crockett approach to the problem, however, is George Hanford's solution. He ran an I-beam from one silo to the other. When the first silo is empty, the unloader is pulled up and slid across the beam to the second one, a good idea if you can do it.

The glass-lined Harvestore type of silo has its unloader at the bottom. There are no problems about getting it back into position when the silo is empty, but complications arise when something goes wrong and the silo is full.

Gutter Cleaners

Gutter cleaners are essentially a series of paddles or a conveyor belt drawn through the gutter to pull the manure out of the barn into a manure pit or to elevate it into a manure spreader. There are portable jobs which are nothing more or less than a scraper which is guided by the operator while it is pulled forward to the elevator by a cable attached to a winch powered by a 1½ horsepower electric motor. This model sells for about $600.

Then there is the chain driven cleaner and the conveyor belt cleaner. The chain driven type has paddles which lie in the gutter and pull the manure along to the end of the barn. With the conveyor belt type, the litter is carried out of the barn on a heavy rubber belt. A return winch pulls the belt back into the gutter position. Another type is the shuttle stroke cleaner. This device consists of a bar to which paddles are attached every 52 inches with a steel pivot pin. As the bar moves forward, the paddles fold across the gutter and move the manure forward; on the back stroke, they fold back against the bar to by-pass the manure they will bring forward on the next forward stroke. The chain belt conveyor or shuttle stroke cleaners cost from $1000 to $1800 installed, depending upon the barn size and layout.

Many barn designers are recommending longer stalls for greater cow comfort and less udder trouble. To increase gutter cleaner efficiency with these long stalls calls for the use of another gadget—the cow trainer. The trainer is an electrically charged bar suspended above the cow's shoulders. If she is standing too far forward in the stall when she humps up to relieve herself, she gets a shock which causes her to move back and deposit her droppings in the gutter rather than on the bedded area of the stall.

Feeders

The gutter cleaner principle worked so well behind the cow that some ingenious farmers adapted them to shove feed along a thirty or forty-yard feed bunk. When the mechanical line feeder rests on the flat surface of the bunk itself, in cold areas it can be raised on a platform of its own, 15 to 18 inches above the feed bunk so livestock won't touch the metal parts with their hot tongues on bitter cold days. Following in the steps of feed lot adaptations of barn cleaners into feeders, various manufacturers now offer the complete set-up. One of these is shown on page 44.

One clever feed lot engineer adapted a shuttle stroke feeder to a horizontal silo. The feeder is laid in a pit which runs down the center of the silo. The pit is covered with boards before the silo is filled just as a sheller pit in a corn crib is covered before filling. Then, as the silage is fed, the boards are removed and the silage is thrown down into the pit and moved along to the feeding area.

For feeding grain in the milking stall the recently perfected "Cow-Matic" system is another labor saver. The "Cow-Matic" borrows a well learned page from the broiler feeder's manual. It uses a quarter horsepower electric motor to provide the reciprocating or shaking motion to a narrow galvanized metal trough which leads from a large feed bin to feed reservoirs located above each cow stall. The grain is moved from the bin to the reservoirs by these vibrating troughs, then drops through downspouts to the manger. The size of the individual ration is controlled by a hand cranked metering device at the manger which doles out one pound of grain at a turn. This piece of equipment is of particular value in a milking parlor. It completely eliminates the need for a grain cart and it is relatively inexpensive. Three hundred dollars will cover the cost of most installations.

Grinding and Mixing

Big hammermills are nothing new on the farm. One of the neatest pieces of equipment to come along recently, though, is the Mix-Mill, an electric grinder and mixer, by which the farmer can grind and mix a fresh batch of feed, a cartful at a time, simply by setting dials and pushing

Mixing feed with a Mix-Mill is like tuning a radio. It grinds, measures, mixes and delivers the feed, freshly processed, right into the feed cart. Four of the dials control the amount of the different grains and concentrate that go into the mixture. The fifth dial varies the speed with which the ingredients are fed down to the mill.

Oscar Lippens is cleaning out his cow barn . . . the electric way. His gutter cleaner drops the manure right into the spreader, and does the whole job in about 20 minutes. The only hand work he has to do is swing the broom for a couple of minutes, around the stanchions.

a switch—almost like tuning a radio.

The device isn't much larger than a radio, either. Grinding is accomplished by a small hammermill with screens 14 inches in diameter and 6 inches wide. A ¼-inch screen is standard; other sizes from 1/16 to ½ inch are available. Any material ½ inch or smaller in size can be handled. The mill has four hoppers, each with a screw feeder, for grains and supplements and the rate of feed from each of these hoppers is controlled by a dial on the panel of the mill. A fifth dial controls the total amount of material which is to be ground and mixed. Once the feed proportions have been determined, the dials are no longer touched and an automatic timer controls the grinding and mixing. All the farmer needs to do for a freshly ground and mixed batch of feed is to push the switch to start the operation and then go on about his business while the mill does its work. About one minute per cow per day is all the time required for grinding and mixing. A two-horsepower electric motor furnishes the power. On one Wisconsin farm on which the mill is in use, it was found that daily electric consumption in grinding and mixing feed for about 60 cows was less than ½ kwh. This meant a cost of under one cent per hundred for the electricity used.

The Mix-Mill itself costs about $400. Used in conjunction with large bins it reduces the feed handling operation to a once-over job from bin to feed cart with no intervening shoveling or sacking.

Can I Afford Them?

It is all too obvious that, while these barn cleaners, silo unloaders, automatic feeders and so on are handy items to have around, a man must have a pretty definite idea of what they are going to mean to him in saving time and money before he shops. The Ag Engineering Department of the University of Wisconsin has been working on this problem for a number of years, using typical dairy conditions a farmer encounters with a 24-cow milking herd.

Their silo unloader, a 16-foot, heavy duty, disc type for grass silage, saved 20 minutes a day at a daily cost of 72 cents. But we have already learned that the average dairyman in eastern Wisconsin earns only 59 cents per hour. How can he spend 72 cents to save 20 minutes? He can't. But the efficient operator, not the average one, in eastern Wisconsin earns $3 an hour, on a 10-hour day. This is the man who can afford to spend 72 cents to save 20 minutes. With time saving barn equipment, such as the electric silo unloader, he is raising his hourly income by having time to handle more cows.

In fact, the whole of dairying in America is following this direction. The more efficient dairyman, earning $2 to $3 an hour, is putting in more barn equipment which gives him time to handle more cows. As a result, he puts more pounds

(*Continued on page* 99)

Lester Pfister's 4-row picker-sheller harvests 20 acres of corn a day, and keeps two trucks busy hauling corn to the dryer.

Stretching the Year

Fall plow-down of fertilizer is the key to big, profitable corn crops. Here's how to do it

By Howard Lathrope

IN THE CRACKER BARREL DAYS of farming when 2-12-6 was the fertilizer that you got no matter what you asked for, it really didn't make much difference whether you put it on in the spring or fall. In those days, plant food experts were arguing about whether 150, 200, or 300 pounds per acre was the right amount. The hitch was that even their top figure was only a drop in the bucket. It doesn't take a mathematician to figure out that those amounts gave 3, 4, or 6 pounds of actual nitrogen per acre. To go a step farther, we know that only about 60 per cent of the applied nitrogen is available to the corn plants because of the position of the fertilizer in relation to the roots. Only an optimist could expect any great results when 2 to 5 pounds of reachable nitrogen is divided up between 12 to 15 thousand corn plants over an acre.

To get down to the facts on corn, we know that it is a heavy feeder on plant food and if a farmer is to produce a 100 bushel crop of corn per acre, then 160 lbs. of nitrogen, 60 lbs. of phosphorus and 125 lbs. of potash must come from the soil, the fertilizer sack, or the liquid tank. But right here we hit a snag, for most soils in the corn belt are not capable of producing 100 bushels of corn without added plant food. To incorporate these tremendous quantities of plant food into the soil, many farmers are planning their corn crop one or two years in advance and getting the fields ready to produce a profitable crop, for the easiest and surest way to cut costs and increase income is to get more bushels per acre.

Once the fertility is restored to overworked soil, the yearly cost of fertilizer is about $36.00; if the corn is harvested and taken off a field, 100 bushel corn will remove 160 lbs. of N, 60 lbs. of P, and 125 lbs. of K. Using a cost figure of 15 cents for N, 10 cents for P, and 5 cents for K, we can see that 100 bushel corn will have a per acre cost of $24.00 for nitrogen, $6.00 for phosphate, and $6.25 for potash.

Building a big yield on an acre takes more than just buying the best seed or keeping the rows clean; it starts with a map with the route laid out. The old way to start a corn crop was to take soil samples from the field and send them to a laboratory for analysis and fertilizer recommendations. But in only a very few cases did the farmer name his production goal when he sent in his soil samples. So the laboratory technician made recommendations on what he thought the farmer might possibly want to grow.

All of which is a little like a man driving into a gas station and having the attendant pump in the amount of gasoline that the average driver buys, with no regard for the distance he hopes to go or the kind of truck or car he is driving. Giving the farmer the average recommendation on fertilizer is the easiest way out; and it certainly costs the farmer a lot less for fertilizer; but it won't grow big and profitable corn crops.

Now the Wisconsin College of Agricul-

(*Continued on page* 104)

Early evening on the old home place (opposite) made a better picture than the clean-plowed fields you'll see this fall. Herb Roadruck of Brookston, Indiana, used a heavy fertilizer application on his corn residues last fall before plowing. In June this year he dug down a foot (left) and didn't find a stalk. A nearby field that was fall plowed without fertilizer yielded plenty of well-preserved stalks (right).

Feedlot Streamliner

Photographs and Research by Joe Munroe

TODAY'S CHISHOLM TRAIL is a narrow roadway of rails, ties and ballast. Every fall about the time the corn leaves begin to rustle in the chill winds, special livestock trains begin to streak along this trail, "hot as a burnt boot," carrying millions of head of cattle in their annual migration from range to feedlot.

One such trip started when Ed Buntenbach, who runs the Garner Sales Company, of Garner, Iowa, called his partner, Ray Skelton, out in Idaho Falls, one summer morning. "I'm going to need another twelve hundred head of cattle, Ray," he said. "Some of those good whitefaces; around 750 pounds."

Skelton made his selection from among the stock of a half dozen ranchers in the rugged Jackson Hole country of Wyoming. Two months later he ordered a special train from the Union Pacific and notified the ranchers he was ready for delivery. A crisp fall morning found the herd assembled at the railhead at Victor, Idaho, urged on by the shouts of the cowboys to the scales and loading chutes (above).

Only in courthouse statuary are scale readers depicted with a blindfold. To the cattleman, the weight ticket is the payoff for months of work and risk. Each rancher carefully watched the balancing of the beam as his stock passed over the scale. Pipe smoking Bruce Porter (opposite page) nodded his approval as Skelton jotted down the figures.

Then came the dirty work. The cattle cars had been cleaned and disinfected, per government regulations, at Pocatello the day before. They were of the latest design with sides coated with a composition paint to keep the warm hides of the cattle from sticking to them in freezing weather. They had been bedded down with fresh, clean straw. From dawn till two in the afternoon it was a battle of cowboys versus cattle—prodding and tailtwisting until 1254 steers were loaded, 35 head to the car.

Then buyer, sellers and railroad agents converged on the local bar and grill; tables became desks for tallying; accounts were settled as checks totaling $175,000 passed from buyer to seller.

468 Tons of Live Beef in 36 Cars

With the peaks of the Tetons glowing in the sunset behind it, and 468 tons of live beef tucked away in the 36 cars between locomotive and caboose, Union Pacific's S-836 rolled down the line on the first leg of its 1504-mile trek. Government regulations require that livestock on a long railroad haul be unloaded at least once every 36 hours for feed, water and rest. Scheduled to make North Platte, Nebraska, 925 miles to the east, within the 36-hour limit and with intervening stops for crew changes and routine inspection, the feedlot special put all other trains "in the hole"—on sidings—except the fastest passenger streamliners.

The cattle were forgotten. From the time they left Victor till the car doors opened at North Platte no one bothered to look at them. The ride is cold in winter, hot in summer and drafty any time. They can't lie down. They just stand there, the only excitement coming from sudden stops and starts.

The steers or heifers which chance to crowd into the front of the cars as they are loaded take the worst beating on the trip. Tight as they seem to be packed, the whole load is compressed into the space of half a car when the train makes a sudden stop. Those up front are squashed until they look like they could walk through a picket fence with space to spare.

The 5-man crews work 8 hours or 100 miles, whichever is the shorter. On a trip like this none of them eat or sleep in the "crummy"—caboose to you. As each new crew takes over, the conductor—"skipper" in railroad jargon—is faced with a mass of paper work concerning the cars and their contents. Veteran Frank Huddart (below) was the "hoghead" on the run from Cheyenne to Sydney.

The special made North Platte with 5 hours to spare on the feed, water and rest deadline. Loaded again after the required 5 hour layover, it sped on through Omaha-Council Bluffs and delivered the cattle at Garner without a single casualty the third day after leaving Victor, Idaho.

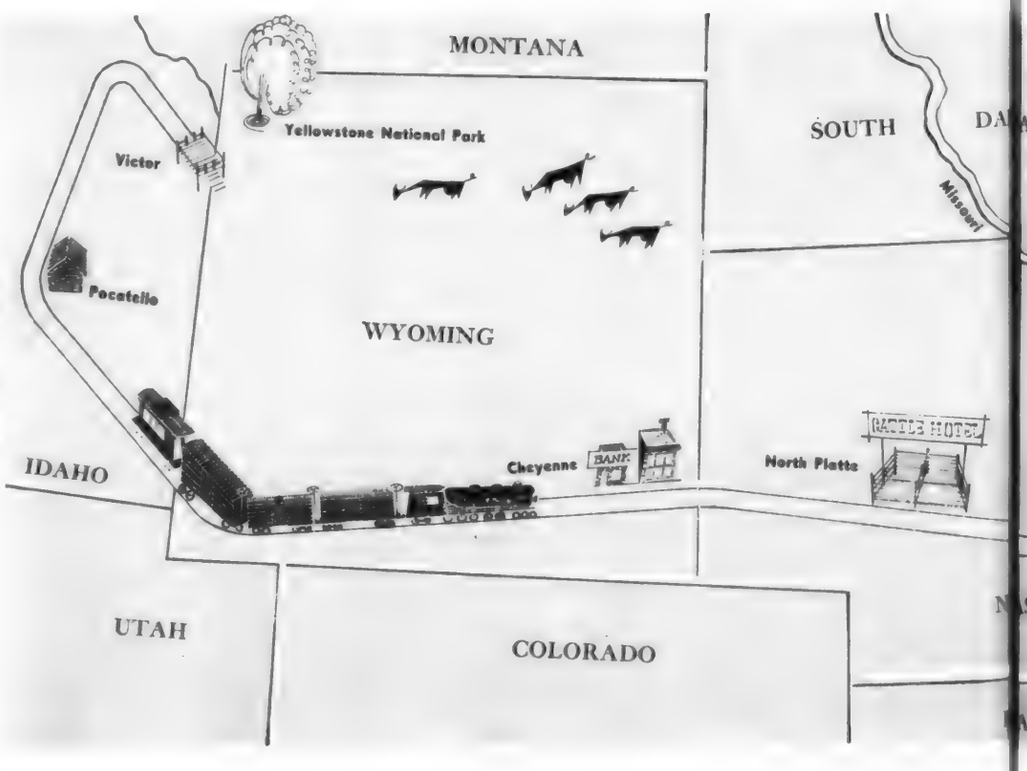
Frank Huddart . . .
Hoghead from Cheyenne east to Sidney

Room Service at the Cattle Hotel, a compulsory 5-hour stop for

The feed yard at North Platte, Nebraska, is run by George Grover who calls the place his Cattle Hotel. One of his helpers throws home-grown prairie hay to the cattle as they come off the cars. Grover had a wire before the cattle left Victor, telling him the cattle would make Feed, Water & Rest stop at his place. He can handle up to 20 cars without advance notice. He has been at the job for 22 years, usually has room for a few carloads of unexpected travelers.

What a thirst! Thirty-six hours in a cattle car make a steer thankful that the engineer finally stopped the train near a hydrant. Casualties on long railroad hauls are surprisingly low—less than one per cent—and the national average for claims payment by the railroads for all causes is only $2.80 per car. Faster traveling times, efficient scheduling, better loading and unloading methods are the factors which hold down claims.

This is the route the cattle took from Victor, Idaho, to Garner, Iowa, a 1504 mile train ride from mountain ranches to prairie feedlots, broken only by one rest stop. At Omaha-Council Bluffs, end of the Union Pacific lines, the train was picked up by the Milwaukee Road and became a Milwaukee unit for the balance of the trip.



F W & R in North Platte, halfway home

There's nothing like a good nap after a fellow's had a little food and drink. The cattle must be given at least 5 hours rest before reloading. While they are in the pens Grover's crew goes into action making ready for another incoming shipment. October is the peak month at the Cattle Hotel. In a typical month, 5,000 cattle, 25,000 sheep, and 2,000 hogs will pass through the place. Feed and labor charges for a train like this will run around $400.

Ed Buntenbach (on horseback) gets his first look at the cattle as they are unloaded at Garner. A yardman hands him the weight tickets showing the weights registered on arrival. After the cattle have had a chance to settle down they are sorted according to size and quality, then sold at auction. Buntenbach sells regularly to buyers in Indiana, Michigan, Wisconsin, Illinois, Missouri, Iowa and Minnesota; handles over 80,000 head of cattle a year.

Home at last. After a few months on corn, silage and hay the Wyoming cattle will begin to fill out and look like these. By the time they are prime beef their train ride will have been long forgotten.

Cattle of distinction all over the south are switching to Coastal Bermuda grass. An offspring of common Bermuda, once considered the curse of the land, Coastal is now hailed as the triple threat grass for pasture, hay and silage. Another strain, Midland Bermuda, is proving its worth in areas a little too far north for Coastal. This Midland runner (below) was pulled up just six weeks after sprigging on an Oklahoma range.

Bermuda Grass

By J. M. Eleazer

BERMUDA GRASS, the curse of the land! That's what it was called when I was a boy. Once we heard of a fellow who had gone at night and sprigged in a few stalks of this hated grass in a neighbor's prize field. To have burned his house might have been better, for it could be rebuilt. But Bermuda grass in his field: that was a lasting plague!

As a boy in the Stone Hills of the Dutch Fork here in South Carolina, I can well remember the dread we held for this plant. And with the rocks, stumps and crude one-horse implements we had then, once it got a foothold it usually took a field over, in spite of our best efforts to get rid of it. Many a time I've seen a hard-bitten family move onto a place where Bermuda grass had gained a footing. With their puny efforts, they'd fight it a season or two as the spots of adamant sod got bigger and bigger in the fields. Eventually the clumps joined and took over. About then the family moved away, poorer and more ragged than when they came. We called that "Surrendering to General Green." And it happened often.

But now, Bermuda grass, once a curse upon the land, has grown into the chief of pasture plants in the Southeast. And one of its hybrids, Coastal Bermuda, has been called "the grass you can't lie about," so prodigious has been its production for grazing, hay and silage. For that reason it has won the name of the "triple-threat grass." Be it grazing, silage or hay you want, it supplies them all in good measure.

A native of the other hemisphere, probably India, we do not know how or when Bermuda grass reached our shores. As early as 1807 it was described as an important grass in the South, important mostly as a pest. And it was hated and feared as no other plant in our midst.

Then, in our time the boll weevil, a dwindling and higher priced labor supply, mechanization, and the growing consciousness of a need for crops plus livestock on the average farm, changed the old way. Once it was all cotton, and Bermuda was its most feared foe. Now in South Carolina we grow only about a third the acreage we once had. The same story applies in all the cotton states east of the Mississippi River. So in this vast area, what is happening on cotton's lost acres is mighty important.

And some significant things are happening. Trees, pine trees, are coming to many of cotton's lost acres. What meaning that has for the future! For this is naturally a tree area, a fast-growing tree area.

Grain is coming to cotton's lost acres. Our acreage has doubled in the past 20 years and yields per acre are up over 50 per cent. The meaning of this in terms of livestock, dairy and poultry products is easy to see.

But more important than trees or grain to cotton's lost acres is that grass has come. Not as a pest in the cotton patch, as we knew it before, but grass as a crop, one that can stand in the market place and count its dollars against competing crops. With it the Southeast is changing from "red hills and cotton" to rolling pastures and livestock along with limited cotton. No longer does much of our land run away in red water to the sea as we grow poorer with it. The steep places are being tied down with sod and trees and you can already tell the difference in the color of some of our streams.

In this awakening we have tried many grasses; and to the utter amazement of many, our old enemy, Bermuda grass, ranks at the very head. Thus the long rejected grass is fast becoming the keystone of the arch to a livestock industry in the south. And its powerful hybrid offspring, Coastal Bermuda, is running rings around the parent variety.

Coastal Bermuda grass is the product of the skilled hand of Dr. Glenn W. Burton, principal geneticist of USDA at the Tifton, Georgia, Experiment Station. It came from one of the many crosses made in 1937 of a tall-growing Bermuda from South Africa, and common Bermuda and Tift, a strain already developed there. From those crosses, 147 of the most promising were selected for further study. The cross later named Coastal was one of these. It spread as much as 18 feet in three months. And also, in subsequent years, it led in rate of growth and spread, disease resistance, sod density, cold tolerance, earliness of growth, and forage yielding ability.

Being a hybrid, Coastal Bermuda makes very few seed, of which the viability is almost zero. Therefore, plantings have to be made from stolons or sprigs. Vast acreages of it have been planted in the Southeast in the past few years. In South Carolina, for example, certified seed sources have been established on farms in every county. There is much need for reliable seed sources, for it is easily confused with other strains. And it does not compete well with common Bermuda. Therefore, seed patches have to be on clean land, and the field plantings need to be on lands not too badly contaminated with common Bermuda.

Sprigging

Coastal Bermuda sprigs or stolons are usually dug up by tearing them out with a springtooth harrow and windrowing them with a side-delivery rake. They should be forked up immediately, taken to the shade, and planted as quickly as possible. However, they will be all right for several days if kept moist in the shade.

For sprigging-in Coastal Bermuda grass, the land should be prepared as for cotton or corn, laid off in about 4 foot rows. Five hundred pounds of 4-12-12 fertilizer are applied with the drill, and bedded on. Then the stolons are set about 3 to 4 feet apart in these rows. Hand planting is done by dropping the runner on the bed and pushing it under with a stick, as is common in setting sweet potatoes, leaving the terminal end of the runner sticking out. Regular power-drawn transpanters and tree setters are also extensively used. And broadcast plantings are made by simply scattering the runners over the land and running a disc harrow over them. If there is a good season in the land and early indication of rain, this method works fairly well, but by far the most of the larger acreages are planted with power setters. Much of this is done on contract at $15 to $20 per acre, the operator furnishing everything, including stolons. Hand setting usually runs about $12 an acre labor cost alone. It takes about 12 to 15 bushels of runners to set an acre. Certified Coastal stolons are selling currently for about 75 cents a bushel.

(*Continued on page* 112)

Coastal Bermuda must be grown from sprigs which are set by hand or machine. Runners like the one at the top of the page are cut into sprigs of proper length in this machine, after being disced out of the seed field and windrowed.

BILL LESHER and his marvelous machines

When Bill Lesher was 14 years old, in 1935, he built his first tractor. Today, he is one of the most efficiently mechanized farmers in America — and most all of the machines on his farm are pieces he has either built himself or adapted to his own use. As a neighbor put it, "If Thomas Edison had gone in for farming, he would have done about what Bill is doing."

Some of the machines which have people talking and which make it possible for Lesher to farm over a thousand acres with surprisingly little extra help are such oddities as a self-propelled combine which he adapted back in 1953 to harvest corn, a three-ton fertilizer truck, and the big Diesel tractor which pulls four 16-inch plows in the spring and is then divided in two and attached to a pump to power the irrigation system during the summer.

Lesher, who is 34 but looks younger, farms 1052 acres—468 of his own, 309 on shares for a neighbor, and 275 acres rented from the Vandalia airport. This year he has 305 acres in corn—200 acres of it is irrigated with sprinkler irrigation—162 acres in wheat, 150 acres in soybeans, 70 acres in hay, and the rest in permanent pasture and trees.

The amount of labor which is required to operate this farm is almost as surprising as the machines used. Lesher, himself, is the only full-time worker. In the spring and fall, his father, who is semi-retired, lends a hand and puts in around three months work: two high-school boys, Kenneth Long, a cousin, and Sonny Flannery, a brother-in-law, each work a month; and another brother-in-law, Herman Flannery, put in five months this year between getting out of the Navy and starting college. The total is less than two full time workers.

"Bill's interest in machines goes as far back as I can remember him," his father says. "He was taking things apart and trying to put them together again before he could talk—and he's still at it."

It was this passion for mechanics which led Bill Lesher to build his first tractor. "I have fooled around a lot with machinery since then, but it was the first two tractors I made that put me in farming," Lesher says. "We were living on a dairy farm and my sisters and I helped run a milk route. It was during the depression and money for new equipment was darn hard to come by. I scouted around the junk yard and picked up a truck rear end, a Clark five speed transmission, tractor wheels and tires, an old Chrysler engine, and some channel iron for a frame. I overhauled the engine and gave it a rebore job and put them all together to make a tractor. When it was finished we had less than a hundred and fifty dollars in it and it would out-pull any other two-bottom tractor around here because it was so over-powered. We used it until 1953 when I sold it and it's still doing a good job over on a farm near Vandalia. When I finished the first tractor, I built another one which gave Dad and me the equipment to do some custom farming."

Farming is what Lesher always wanted to do and what he has done supremely well. Always he has been a farmer first and his mechanical ability has made him an unusually successful one.

When he finished high school, Lesher went to work in a garage to earn enough money to equip himself for farming. "I learned more in the five years I worked in Lauren See's garage than I did all the time I was in school," Lesher says. "I think school is a waste of time, anyway. A fellow goes to school at the wrong age. When you're foolish you should work, and go to school when you've got more sense."

The Leshers sold the dairy farm in 1947 and bought the present farm—Bill owns a third interest and his father and mother each own a third. As soon as they were well settled, Bill arranged to farm the 309 acres of a neighbor, R. H. Brundrett, on shares. Since then, he has been building up his stock of machines and searching for more land to use them on.

Harvesting Corn

Corn harvesting has always been a challenging mechanical problem to Lesher. He believed that corn, like wheat or oats, should be brought from the field as grain rather than on the cob with the job of shelling it left for later. His first solution was to buy a stationary corn sheller, mount it on wheels, and power it with an old Willys engine. He changed the elevators so that it would deliver the grain into a bin, and attached the whole rig to the corn picker. This contraption worked very well: the picker dropped the ears into the sheller hopper and the shelled corn was delivered into a 70 bushel bin. The major drawback was that the arrangement was clumsy—the 12 outside rows had to be

Bill Lesher (left) shows his daughter the speedy MG against which he won a road race with his souped-up fertilizer truck. Next time he may lose, for he is now building a faster engine for this sports car. The strange contraption on the next page is the dual-purpose harvester which he contrived—the switch-hitter of the farm machine world. In the summer, this self-propelled combine runs through the small grain as it was originally meant to do; come fall, it sports a two-row corn picker on front and picks and shells the corn. Changing from the grain head to the corn picker attachment takes 15 minutes. John Deere has developed a similar machine for those who are not mechanical geniuses.

JOHN DE

Moving irrigation pipe has been simplified by building a special wagon for the job. By extending the coupling pole, Lesher was able to put the wheels out where they would do the most good. The wagon carries a half-mile of pipe on one load which makes it possible to move a setting in an hour.

opened up before he could get into the field with it.

At corn picking time in 1953, Lesher read that the University of Illinois was trying to harvest corn with a grain combine. He immediately drove his self-propelled Deere combine into the corn field to see what would happen. He hadn't gone far before the whole mechanism was jammed with the heavy stalks and he put the combine back in the shed.

"I kept thinking about the problem," he recalls, "and one night, right in the middle of corn harvest, I got an idea. The next morning I tore my corn picker apart and took the grain head off the combine. Then I rebuilt the corn picker head to match the attachments of the grain head so that the picker would fit the rest of the combine. It took me three days to make the change and every one thought I was crazy. When I finished I drove out in the field and started picking with the combine. The ears were snapped off and went into the combine where the grain was shelled and separated from the husks and cobs. The stalks stayed on the ground and didn't interfere with the threshing. The thing worked beautifully from the start; and it only takes fifteen minutes to shift from the grain head to the corn picker."

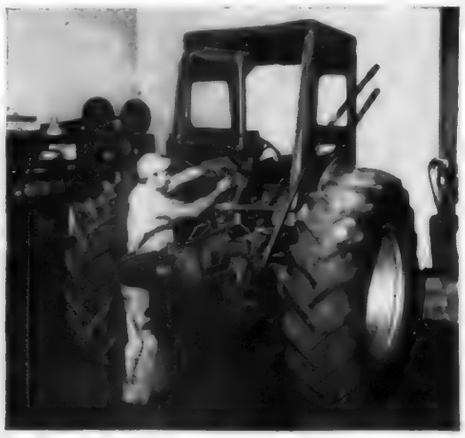
Since then, Lesher has converted several other combines for neighbors. The biggest of them has a four-row corn picker attached. This works as well as his smaller ones. He took his idea to the John Deere people and found that their engineers had finished their first experimental model of a similar machine at about the same time he was building his. This year, they have put their model on the market.

Fertilizer Application

Like most farmers, Lesher rebels at lifting fertilizer bags and slowing down corn planting with dozens of stops to refill the hoppers. Back he went to his hunting grounds, the junk yards, and picked up a three ton truck chasis. On this he put a lime-spreader body and changed the operating mechanism by gearing it with two Ford transmissions to give him extra speed in unloading when he used the truck for grain rather than fertilizer. He picked up

Lesher's masterpiece is this Diesel tractor which he built from parts. In the spring, it pulls four big plows or multiple harrows.

After plowing, Lesher separates the engine from the rear end and bolts the engine half to his pressure irrigation pump.



During the summer, the front half of the Diesel tractor supplies power for the high-pressure irrigation system.

a Cadillac engine, rebore the cylinders and put in Chevrolet truck pistons, milled the head to get 8.5 to 1 compression, and put in a Holthouse ignition. To cool the engine he installed a White truck radiator. With this truck he raced and beat Herman Flannery, his brother-in-law, who drives a British MG. More important to Lesher is that he can put on heavy applications of fertilizer driving over the fields at 15 miles an hour.

Irrigation

When Lesher decided that irrigation would pay on his farm he almost drove the family crazy by insisting on visiting every farm he could find which was using irrigation. After studying the operation of the many systems he saw and talking over irrigation with several dealers, he decided that the problems on his farm would be a cheap source of power for the pump and some way to move sprinklers and pipe quickly. "We saw guys moving pipe on a two wheeled wagon and every time the wheels dropped into a low spot both ends of the pipe would hit the ground and the front end would dig itself full of dirt," Lesher says. "We saw some other fellows hauling pipe on racks they had built on their tractor, which was good, but they couldn't haul much pipe that way. I built a four wheeled wagon with an extended coupling pole so that the wagon bed was long enough for the pipe. With a high rack on one side and a low one on the loading side we can pile on a half-mile of pipe and pull it any place on the farm with a light tractor."

Since his soil was sandy and could take heavy applications of water, Lesher chose a high pressure system. Three giant sprinklers are moved to different outlets along the pipe every two hours. "The first year we used the system, the sprinklers were mounted on tripods which were bolted to the pipe to keep them from swaying around when the pressure is on. Carrying those heavy sprinklers through a hot, muddy corn field convinced me that there must be an easier way to handle them."

Lesher's solution to the sprinkler problem was to mount each of them on a five foot axle with a pair of wheels. Six feet of pipe from the axle to the connection on the main line adds to the stability of the setting. He also installed a riser so that the sprinkler stands well above the corn. Having put wheels on his sprinklers, he built a little five-horsepower tractor with which he can drive to the setting, hook onto the sprinkler, and tow it to the next setting.

To supply the power needed to run the pump on the irrigation system and keep up the necessary 100 pounds pressure in the line, Lesher created what many feel is his masterpiece. He figured that the ideal power source would be a big Diesel engine. But this would tie up a lot of money in a system he only used two or three months out of the year. It was the same problem he had run into with his longing for a big, powerful Diesel in the spring to speed up plowing—too much money for a tractor of limited use on his farm.

When the solution to this problem struck Lesher, he was back haunting the junk yards again. When he had finished his shopping, he had a big junked tractor he had picked up in Illinois, a new GMC Diesel engine, and his water pump. He stripped the old tractor, widened the front axle and strengthened it, and installed the engine. Then he cut the tractor in two right at the point where the engine fits into the transmission. On both ends of the cut frame he welded heavy plates so that the tractor could be bolted together again. Then he built a frame for the pump which also was fitted with plates that would exactly match those on the tractor frame. Now he has a tractor which pulls four 16-inch plows all spring and is then rolled into his neat, well equipped shop and separated. The engine is attached to the frame of the pump and out it goes again to power his irrigation system all summer long. The conversion takes him about a half day.

The only livestock on Lesher's farm today is his collie dog, Skip. Until two years ago he always had around a hundred head of feeder cattle, but has given this up because he felt that he was not in a position to compete with big feeders who specialized in this business. "Since then," he says, "it has been like a vacation around here. You just can't mechanize cattle the way you can crops."

He admits, however, that he never used a pitchfork when he kept steers. Manure was mechanically handled with a tractor and feeding was also mechanized. He put in a silo unloader which dropped the silage into the blower which had originally loaded the silo. By extending the pipe and changing its direction he arranged for the blower to pile the silage directly into the feed bunk. Hay and grain were fed by gravity from the second floor of the barn.

Quite often, Lesher will change a piece of new equipment before he ever uses it. Two smaller Diesel tractors had the cylinder and pistons changed from three and a half inch bore to a three and three quarters to step up their horsepower, before he took them from the dealer's shop.

This year he bought a four-row corn cultivator and changed it to a five-row bean cultivator according to the plans he had worked out before he ever bought the rig. Works well, too. According to a neighbor who borrowed it, it will cultivate 50 acres a day easily as compared to 30 acres for his old cultivator.

Though it is perfectly clear that Lesher would rather fool around with machinery than eat, the equipment that crowds his long, low machine shed next to the old springhouse is there only because it pays its way. The corn combine saves days of labor in the fall, since it eliminates the need for opening up the fields and harvests

A Lesher-made tractor moves the big sprinklers to new settings. Pipe is moved but once a day.

them faster and it makes one machine do the work of three, a wheat combine, corn picker, and sheller. The big Diesel speeds his plowing and cut the cost of his irrigation set-up by around $1,000; and the wheeled sprinklers, baby tractor, and pipe wagon probably save more time than any other combination of equipment he has on the farm. As far as Lesher is concerned, if he has to satisfy his mechanical urge by building an impractical machine he might just as well get his kicks out of constructing a model railroad.

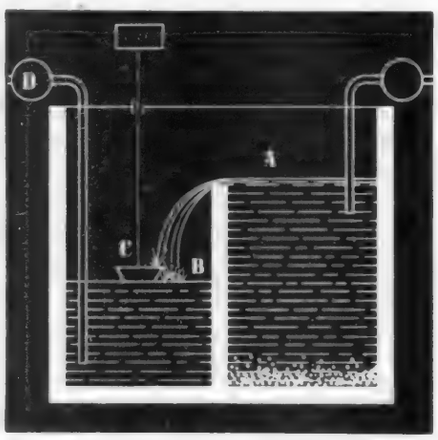
When farmers go home after a visit to the Lesher place and tell their wives about his mechanical ability, they often hear something like, "What I could do with a man like that around the house. I'd have everything around here fixed in no time." But they are wrong. When asked about his ability as a household fixit man, Lesher admits, "When something goes wrong around the house, I do the sensible thing—I call the repair man or else I call my other brother-in-law, who is a contractor."

Lesher is rather amused at some of the talk about him. When he heard that someone had compared him with Edison, he shrugged his thick shoulders and said, "That boy really got enthusiastic. I'm not an inventor at all. I'm an adapter. You ride along all day on your tractor and you hatch ideas all the way about how you can make the work easier. About one per cent of them are any good and you work on these. If you get a few good ones, you find that your farming is easier and will make you more money."

Pond water, properly filtered and disinfected, makes wholesome drinking water. It takes only a few minutes once a week to test the water for purity

Drinking Water From Ponds

With wells failing and water tables falling everywhere, farm pond construction has been on the increase the past few years. This took care of the livestock, but when wells gave out, as many of them have done, the family was caught without drinking water. A recently built pond on the Joseph I. Williams farm near New Richmond, Ohio, has provided ample water for livestock and outdoor use for three seasons, two of them exceptionally dry. When the house well gave out, Williams was like the fabled mariner, without a drop to drink.



By using two water pumps and a float switch in the holding cistern, purification of water is made automatic. The first pump draws water from the pond, filling the right-hand section of the cistern (A) where chlorination and settling take place. As water is drawn by the second pump (D) from the section to the left (B) the float switch (C) starts pond pump and chlorine feeder, causing treated water to overflow the dividing wall.

It was not cheap for Williams to convert his pond water into clear, wholesome water, safe for drinking and other household purposes, but he considers the expense an investment in convenience. He is confident his water problems are over.

In one corner of their utility room, just off the kitchen, the Williams family have set up a miniature water-treating system. As every drop of city water, regardless of usage, must be safe to drink, all water drawn from the pond is purified to drinking quality. "Pond water," Williams says, "would have been satisfactory for lavatory and outside uses, but you can't keep children from drinking from a garden hose or a barn faucet. The equipment charges for treating all our water were hardly greater than the cost would have been to set up a double pump and piping system. With treated water in all lines, piping and tanks will last longer. Plumbing fixtures keep cleaner, too. Purifying all the water we use, including lawn sprinkling, amounts to only a few dollars more a year than it would for a smaller unit to purify the gallon of drinking and cooking water an average person consumes each day."

Maintaining a good water supply, whether rural pond or well or municipal treatment plant, demands constant vigilance. The equipment in the Williams' utility room operates automatically, but Joe Williams reserves a few minutes every Saturday to check the purity of his water.

Pond water is subject to rapid changes in purity. Rain water is of good quality when it falls, but it picks up contamination in running over the surface of the soil before reaching a pond. In a pond, sunlight and settling help to purify it, but each rain brings more turbidity, which is a measure of the foreign matter held in suspension. Much of the impurity, mud, seeds, insects and bits of vegetation, as well as algae, can be removed by passing the water through some type of filter. Bacteria germs, present in all pond water, cannot often be detected by taste, odor or color and are not all eliminated by filtering. Such impurities require chemical treatment to make the water safe.

A Small Waterworks

The Williams' water system has been well planned. It involves two small water pumps, a disinfectant pumping device, a holding cistern and a two-tank filter, plus the usual pressure tank. Water is taken from the pond through a floating inlet near the surface, for surface water contains more oxygen and less sediment, giving better flavor and less odor.

The holding cistern, just outside the utility room, is 8 feet in diameter and 8 feet deep. A center dividing wall, seven feet high, provides 2 compartments. One side serves as a settling and dosing compartment for water pumped from the pond. Here, germicidal chemicals are fed into the water by the disinfectant pumping device housed in the utility room. The second compartment is for storage of treated water. The water level

(*Continued on page* 82)

In a corner of his utility room, Joe Williams of New Richmond, Ohio, has set up a miniature waterworks which gives him a safe and plentiful supply of water for all domestic purposes. The heart of the system is the chlorinator, on the shelf to the left. It is really a small metering pump for drawing diluted household bleach from the jar beneath it, pumping the bleach into the water held in a cistern just outside the utility room. The cistern is of sufficient size to permit the chlorine bleach to act on the water a minimum of thirty minutes to effect a complete kill of all germs before being drawn upon in household usage. From the holding cistern, the disinfected water is pumped through a sand filter, the tank to the left, which removes bacteria, algae, silt and other impurities. Finally, the water passes through a second tank, which contains activated charcoal. The tank at the right contains charcoal, which filters out color, minute suspended matter and odor. Filter tank maintenance is simple, requiring pressure-operated backwashing only once in two months.

Biggest Boob in the Barnyard

By John Largo

Through the courtesy of Imperial Oil Review.

NOT LONG after the Puritans set up shop at Plymouth, Mass., a colonist by the name of Thomas Morton one day noticed a bunch of hefty-looking brownish birds stalking across a clearing. He pointed them out to a convenient Indian. "Do you see many of those birds in the woods?"

"Neent matawna," said the Indian. "More than we can count."

With the Englishman speaking English and the Indian answering in Indian, it is difficult to see how they could carry on much of a conversation, but that is the way the story goes. It is not the only confusing aspect of the Tale of the Turkey—for it was, indeed, a flock of wild turkeys which Mr. Morton saw marching across the clearing.

In the first place, the turkey has nothing to do with Turkey. More sensibly, the Turks themselves call him the "American bird," (in Turkish, of course) or *Meleagris gallopavo*—as zoologists have dubbed him in a futile attempt to clear up a murky situation—is strictly a native of the American continent. Indians were gnawing on his drumsticks at least as far back as 1,000 A. D. Later, when the Spaniards were liberating Mexico,

the turkey was officially found, and the Conquistadores brought Mexican turkeys (now commonly known as *Meleagris gallopavo*) back to Spain after 1521. From Spain, the turkey gobbled his way across Europe. He was introduced into England some time after 1524 and there began the process known as "Improving the Breed," which resulted in the modern turkey, much heavier and infinitely more stupid than his wild tequila-drinking forebears.

The Official Story

Unfortunately for all concerned, a mural has been found in the church of St. Peter at Schleswig, Germany. Below the mural is a frieze. The frieze has eight medallions. The medallions depict American turkeys. But the mural was done in 1280 A. D., and so, according to art authorities, were the medallions. This raises the fascinating possibility that Norsemen brought back wild turkeys from legendary "Markland" long before the Spaniards decided to find out what was going on in Acapulco.

When historians fall out, the best thing to do is change the subject. Whoever imported the turkey, he was an expensive bird in the early days. If you hesitate at six or seven dollars for a 15-pounder, think of the Danish poultrymen of 1538, who were soaked $38 per bird. Later in the 16th century the price dropped to $15 in England. In Greece, a century later, children kept turkeys as pets—handsome, white-tailed birds that retailed at $70 each, which was, in those days, a lot of drachmas.

Fighting For His Life

While his European cousin was being bred slowly into a larger, heavier-breasted, boastful barnyard boor, the American wild turkey was fighting for his life. A lean, athletic bird, usually silent—not given to gobbling idiotically about nothing—*Meleagris* was a doomed fowl.

In the markets of old York and Boston, wild turkeys sold for 25 cents each, and a hunter could slaughter 30 or more a day, especially when snow covered the ground and tracking was easy. As an aeronaut, the wild turkey was limited to brief evasive action taken over the nearest treetops, but his forest refuges were slowly vanishing under the axe of the pioneer. Why the pioneer wanted to clear the land to plant such articles as potatoes and turnips, when he could simply have dined on wild turkey, is not too clear, but in 1851 the last of Mr. Morton's turkeys was killed in Massachusetts, and the last Ontario wild turkey seems to have given his final gobble about 50 years later.

In Ontario, a closed season on wild turkeys was declared in the years 1902 to 1905, but by this time there were none left, of the type known as the Eastern turkey. Finally in 1940, seven wild turkeys were seen near the Balmy Beach Canoe Club, outside Toronto. A local resident, it is reported, tried to make friends, but the birds headed for the tall timber.

In 1954 the Toronto Anglers and Hunter's Association imported 200 wild turkey poults and released them, hoping they would take up residence within shooting distance.

Just about the time the last wild Massachusetts turkey flew to his heavenly roost, an unknown farmer in Rhode Island developed a new breed of turkey by crossing an imported European strain with the native wild birds. Then in 1860, Rev. R. H. Avery of New York seems to have produced the present Bronze breed by taking the Narragansett strain and mixing it again with the wild line. This Bronze breed is the most popular turkey raised at present. It is a large bird, rugged (for a tame turkey) and is raised either in brooding houses or on the range, cattle-style. If you drop into a store around Thanksgiving or Christmas and emerge with a 12- or 15-pound turkey, the chances are that it is, or was, a Bronze.

Bronze Most Popular

While the Bronze is the most popular, there are probably about a dozen breeds of turkey currently being raised by large-scale turkey farmers, by farmers who keep turkeys as a sideline of doubtful profitability, or by people living on small acreages who raise their own produce. There is the heavier, more-white-meat Broad-Breasted Bronze; the pure-white, brown-eyed, smaller White Holland; the venerable Narragansett; the rich, dark-brown Bourbon Red, who isn't bad-looking, for a turkey; the pink-toed, all-black breed known, not unnaturally, as the Black; the small Nittany turkey—developed from the wild turkey. Some people raise wild turkeys, in fact, not a "true" wild turkey, but rather a strain descended from the original wild turkey. The original, according to early writers on the subject, was proud and untamable.

A breed which is becoming more popular now that families are smaller is the Beltsville White. This is a rather mongrelish turkey, ancestrally speaking, but it can reach a weight of six pounds, dressed, in about 12 weeks, and roasts exceedingly well at this stage. For this reason it is sold as a turkey broiler, although few people broil them. The larger Bronze, on the other hand, requires from 24 to 28 weeks to reach good eating trim, and in this time a flock of Bronzes can eat the turkey farmer into bankruptcy. Put another way, the Beltsville broiler consumes 21 pounds of feed compared to 40 or 50 pounds of feed for broiling chickens or capons, yet the turkey broiler is meatier, with less shrinkage in cooking.

Other less popular breeds include the Royal Palm, a small black and white turkey of good appearance and complicated ancestry: the Buff, a descendant of a misalliance between Blacks and Bourbon Reds; and the Blue, created by crossing the Slate and the Black.

(*Continued on page* 96)

What nature had in mind in designing the turkey is a dark mystery. His head and neck appears to have been made out of spare parts. The wrinkles and the harassed look are not from age, but from trying to figure out what it is all about. His low brow marks him as a true bird-brain. What the snozzle is for is anybody's guess.

Marketing three more pigs a litter is the target of the

HOG INDEX SYSTEM

By Ed Mercer

Ed Terrill (above) has reason to smile; in four years, he has built up his sow herd to a point where they are producing 25 per cent more pork in each litter farrowed. Most of the credit for this improvement he gives to the Wisconsin Swine Selection Program which he follows.

Weighing the pigs (below) is a part of this program. A pig's weight at five months is required to figure its index number; Terrill also weighs at birth and weaning time for his own records. The frame, lever, scales, and weighing box are loaned to cooperators in the program by the University of Wisconsin.

SINCE MAN first domesticated the wild boar, farmers have been trying to figure out breeding systems which would overcome the sow's tendency to produce just enough pigs for the survival of the species and make her produce enough for the economic survival of the farmer. With the help of genetics, a number of new systems have been developed in recent years to help the farmer single out the animals which have high production bred into them and which are able to pass it on to their young.

All of these systems hinge on identifying the animals involved and keeping careful records on how they and their young develop. Some farmers feel that all of this ear marking and record rigamarole is not worth the bother. They pick their breeding gilts from the left-over pigs after they have topped the herd for market, or they select them on eye-appeal alone. Ed Terrill is not one of these—and he points out that the record keeping he and his wife, Ellen, do is one of the most profitable jobs on their farm. By religiously following the Wisconsin Swine Selection program for the past four years, and by doing a good job of management and breeding, he is now marketing three more pigs from each litter born.

Terrill, who went back to his book-binding business after serving a stretch in the Navy, from Pearl Harbor to Tokyo, gave in to a strong urge to become a farmer in 1951. He had to follow the system as faithfully as a bride follows the directions in her cook book because he didn't have any farm know-how to fall back on—or to lead him astray. When red-headed Terrill and his auburn-haired wife started farming their 310-acre, Dane County, Wisconsin, farm, his experience consisted of two university short courses and a brisk tussle with the bankers who financed the working capital. "I decided to stick to the university feeding and management recommendations," Terrill now says, "and to follow the swine selection program I had learned about in the 2-year short course. When we bought the farm livestock, we found we had thirteen bred sows with no production records on them. I decided to choose my next gilts according to their indexes. That first year, our indexes averaged between eighty and ninety on the first batch of pigs; last year the indexes ran between a hundred and twenty and twenty-five. That's how we've come up in the hog world."

(*Continued on page* 126)

Vigorous pigs that can convert feed into pork economically are the end result of swine improvement programs.

Man With a Power Hoe

Rotary tillage has had its ups and downs. Now, with improved models, farmers are learning the technique

By Chester Charles

LATE LAST FALL storms from Lake Michigan, a dozen miles away, whipped across La Porte, Indiana, lashing the countryside with 8 inches of rain in 2 days. In all, 17 inches of rain in 17 days cut through the sandy hillsides and submerged the muckland.

The newly-planted rolling wheatfields of Frank Rickman were the only fields in his area left unscarred. Neighboring fields were gashed with two-foot-deep gullies, but his soil, some of it no better than the worst in the county, took the pelting storm in stride and produced forty bushel wheat at July harvest.

This is Rickman's third year for replacing plowing and discing with rotary tillage, to which he attributes his ungullied hillsides. Every one of his 347 acres has felt the churning bite of his rotary tiller, a 70 inch contraption of sharp hoes revolving at 200 rpm around a wheeled shaft nearly 6 feet long.

Rickman has no livestock on his farm, no manure to boost his yields. But his corn tops the hundred bushel mark and his oats came near it this summer. It was not always so. Under a livestock program, with conventional plowing, he has produced 60 bushel wheat and 110 bushel corn. His first year with rotary tillage, his corn went as low as 55 bushels and some of his wheat shrunk to 18 bushels per acre. The fault wasn't in the use of the rotary tiller. Rather, it was in Frank Rickman's misuse of it. In learning to manage the new tool, he first had to learn a new system of farming.

A Look Backward

On a farming scale, rotary tillage, which was something of a flash in the pan a dozen years ago, has been quietly simmering ever since. Here and there, it has become a white-hot issue again. Early rotary implements, denounced as cumbersome egg-beaters which whipped the earth to a froth and destroyed granulation and turned clay soils into sun-cured bricks, never quite caught on. At that time, part of the fault *was* in the machines. Even then a good deal of the trouble was with the Frank Rickmans of Missouri and the Frank Rickmans of Pennsylvania who didn't have the patience of Frank Rickman of La Porte, Indiana.

In the intervening years, two things have happened. Manufacturers have found out how to build better rotary tillers; and farmers have found out how to use them.

When sales of early farm-sized tillers dribbled, manufacturers, convinced that they had something, turned their attentions to producing and improving garden models. World War II brought a new crop of home gardeners, most of whom were power-tool conscious. After the war, interest in gardening continued, especially among city workers who had the down

payment for that little ranch house a few miles out. Availability of home freezers and garden tractors kept the back yard vegetable business thriving. Each year, more and more makes of garden tractors appeared. These garden enthusiasts were impatient with small turning plows, toy discs and the infinite choice of cultivator attachments, quick-on, quick-off, and quickly junked. The gardeners wanted one simple power tool to take over for the rest of the season after some nearby farmer had plowed the patch. Rotary tillers, either in self-propelled models or as attachments for walking tractors, did the trick. Several dozen new makes flooded the market. Competition improved design and sales mounted. In 1940, sales of garden tractors of all types totalled 9,350. In 1954, sales of rotary garden tillers alone exceeded 42,000. They have found great favor among nurserymen, whose investment per acre is greater than among any agricultural producers.

More than a few farmers began to note an improvement in their garden soils after a season or two of rotary cultivation, especially where organic materials were incorporated. One such farmer lately visited a large rotary tiller manufacturer, saying his wife had done such minor wonders with a garden rotary tiller at home that he wanted them to attempt building him a size to try in his big fields. The sales department, with side glances at their advertising brass, quickly showed him their full scale models, of which he was blissfully unaware.

Today, farm-sized tillers, some of them genuine behemoths, are beating their way into farmer acceptance. There are a half dozen companies in the market, most of them backed up by years of experience in the rotary garden implement field. The three big names in farm rotary tools are the Seaman Tiller, produced in Milwaukee, the Rototiller, made in Troy, New York, and the Rotovator, of British manufacture, and Arlington Heights, Illinois, distribution. Sales are still a bit of an uphill fight, however.

Rotary implement design has been improved in three ways. Rotor speeds in most models have been slowed down to prevent overpulverization. Tine or blade design has made big steps forward, with various styles now available for shearing, pulverizing or mulching action. Tine breakage has been reduced by protective mountings.

New Tools, New Ways

Hundreds of farmers who never heard of Faulkner and his moldboard plow follies, have independently discovered that plowsole greatly limited yields. Frank Rickman, of northwestern Indiana, knew nothing of Faulkner when he first attempted to find a better method of seedbed preparation than plowing. Plowsoles were not on his mind. It was just that a plow share wouldn't scour in his sticky, marl-underlaid soil.

At a substitute for plowing, Rickman first tried a field cultivator and disc. He says, "When the soil was dry on the surface, water laid underneath and the disc got stuck. When the ground got thoroughly dry, the disc got buried, and I'd be pushing dirt, grinding it into flour." Later, Rickman tried an offset disc. It took too many passes to cut to seedbed depth. Since he frequently follows wheat with wheat, he found that bunches of straw left on the field were not cut or not evenly mixed in the soil by the offset disc with the result that the crops were similarly uneven. Germination was poor in some spots where straw was insufficiently buried and lodging resulted where plentiful nitrogen worked on the wheat straw.

His first season with a rotary tiller he tried to get a fine seedbed down to the old plow depth on a field where there was little organic matter to incorporate. Power requirements were excessive. The going was slow and tedious. Drainage was bad and the soil dried to a baked-on finish.

Last year, Rickman subsoiled his worst drained acres. He didn't consider the depth in inches important. All he wanted to do was to get reasonably below the old plowsole, which had been so tough that in former years his moldboard plow raised up and down without adjustment as it rode the hardpan tracks of earlier plowings. After subsoiling, he followed with a field tiller, ripping the soil loose in strips, bring up larger clods from below. A shallow rotary tilling completed the job, mixing vegetation thoroughly in the top 2 or 3 inches of soil, where it was most needed for quick germination of planted seeds, and where microbial action is greatest for quick conversion to humus.

Rickman has no argument with the moldboard plow. "If I had a different type of soil," he says, "no doubt I'd still be using a plow. You've got to loosen soil to plant anything. The only way to loosen soil is to lift it. Plows lift it best for some farmers. I use a field cultivator to lift it and a rotary tiller to mix it up. Maybe there is some theory involved, but I'm not preaching it. I'm just doing what works best for me."

Plows and Plowmen

Luckily for rotary tiller manufacturers, their implements were being introduced on the market at a time when the moldboard plow was under fire as agriculture's worst invention. Indictments against the plow were primarily directed against plowsole, the familiar hardened layer of the soil at the bottom of a furrow caused by downward pressure of the plow as it is drawn through the earth. Plowsole is most likely where heavy soil has been plowed

In the past few years, most of the bugs have been taken out of rotary tillage equipment. Selective rotor speeds, improved tine design and shock absorbent mountings have given current models wider usefulness, better performance and trouble-free durability. The self-sharpening, hoe-like tines of the heavy-duty rotary tiller (above) chop vegetation and mix it evenly with the pulverized soil to working depth. The area in the foreground was spaded to show the tilled and untilled soil profile. Frank Rickman, Indiana farmer (opposite page), uses a 70-inch power take-off rotary tiller in all his seedbed preparation. He is building up his soil without livestock manures by relying heavily on rotary tillage for turning crop residues for bumper yields, while simultaneously protecting his acres from erosion.

when wet. This causes poorer drainage in the very soil types which have drainage problems even if no plowsole exists. Sealing of the soil structure cleaves topsoil from subsoil so that pools of water can stand on the surface for days though the soil beneath the plowsole may be bone dry. Such land, as soon as dry, bakes into cement, then cracks, admits little further moisture and supports meager plant or bacterial life.

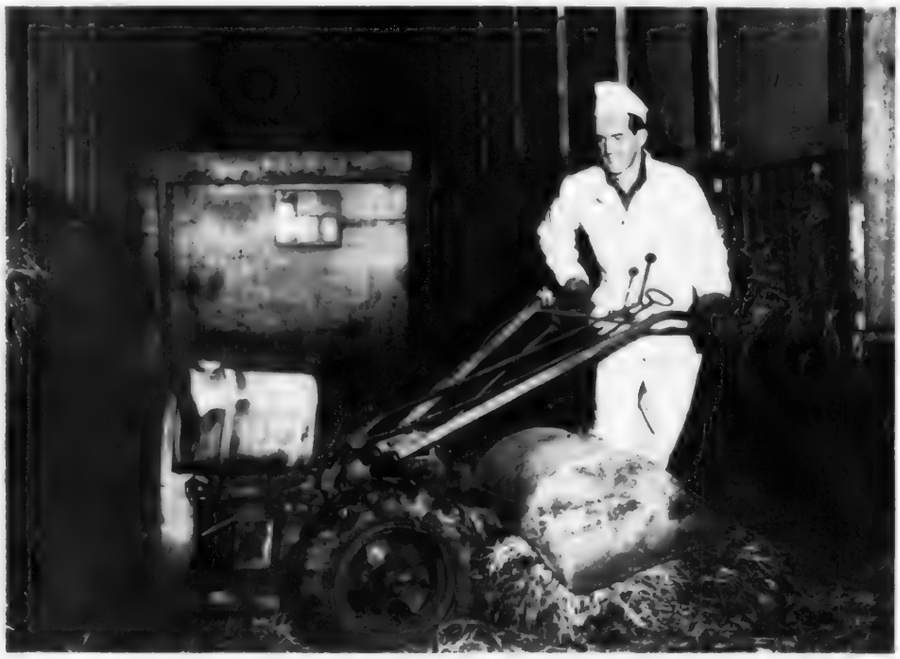
Though state colleges for years have stressed that good plowmanship calls for standing the furrow slice at an upward tilt, enemies of the plow rightly point out that in practice the average furrows are inverted, with vegetation buried upside-down and forming a blanket at the bottom of the furrow. This blanket of organic matter, laying just above the plowsole, further reduces capillary action and often remains undecomposed for seasons, giving little of its organic benefits to the crop for which it was turned under. The disc rarely gets down to this level to mix the material, or if it does the soil is harmfully over-pulverized. Lack of organics in the upper inches of topsoil reduces water absorption, impedes drainage and prevents aeration. On the plowed surface, the soil is left bare and subject to erosion. Under such conditions, good tilth is impossible.

The husky midget (below) is primarily intended for narrow row garden cultivation. If working in reasonably open, unplowed soil, it can prepare a seedbed to a depth of six inches in several passes. Both garden and farm-sized rotary tillers have uses beyond that of seedbed preparation. The giant, self-propelled models lighten the task of land clearing, chewing up four-inch saplings with other surface vegetation while at the same time readying the ground for planting. Medium-sized rotary tillers are useful in road, ditch and pond construction. The more rugged of the garden models (right) make short work of fluffing up and increasing the absorbent qualities of stable bedding and poultry house litter. The two-row agricultural rotary tiller shown on the opposite page, with hood up to spread chopped vegetation as a surface mulch and to prevent the soil from being broken too fine, can cover from one to three acres per hour, making a seven-inch deep, erosion-proof seedbed in one pass.

A Segment of the Circle

A great many farmers have entirely discarded their moldboard plows. In England, where rotary tillers are more common than here, fall plowing is often practiced, with the ground left in the rough over winter. Surface mulch of any available organic material is spread for protective cover and is mixed with the soil by rotary cultivation the following spring. In similar manner, rotary tillage in this country, rather than being the mere substitution of one piece of equipment for others, is being practiced most successfully where combined with organic farming methods as an altered agricultural system.

Rickman's case stands out. Like Louis Bromfield, another champion of rotary tillage, Rickman is stuffing his soil with any organic material he can salvage. Though Rickman has little knowledge of the earthworm fringe of organic extremists, he has discovered the benefits of trash-mulch practices, of "power composting", of surface-spread crop residues and of promoting heavy straw and stalk growth for greater organic return to the land. As proof of his convictions, he has more than once sacrificed a good stand of new clover by not removing a heavy smothering of combined straw and stubble, for he believes the straw can give more immediate organic bulk while the stubble offers better erosion control than clover. Rickman sees beyond this season or next. As he puts it, "I used to aim at big yields as my goal. Now my goal is to build up my land. Big yields are a by-product."



Methods and Advantages

Rickman always had difficulty plowing under heavy straw. This spring, on one part of a field of corn stalk ground he hand-spread 200 bales, or about 5 tons, of straw per acre, then broke it and the corn stalks up with a stalk cutter. Three shallow rotary tillings were necessary to mix the material into the soil. Corn was planted May 10th. By July, soil profile examinations showed little or no remaining straw, which in less than three months had almost completely decomposed. The growing corn roots could be seen following channels left by the rotting straw.

Rotary tillage, so supplemented by humus, is lessening soil compaction on Rickman's acres. Even thirteen ton lime trucks no longer compact it as they used to. The soil springs back up now. Surface crusting is never more than slight. Each retilling of a field requires less power. The shallow rotary cutting he now practices to keep organic matter near the surface can be done in faster gear, leaving a seedbed that is reasonably fine on top without excessive powdering and with cloddy tilth below for greater water absorption and retention. With this method, Rickman has had more uniform crop stands than at any time in his career.

Exceptionally dry soil sometimes requires two rotary tillings for fall planted crops, or Rickman may sandwich one rotary tilling between two opposite chisellings with the field cultivator. He has found that by chopping trash with a stalk cutter or rotary mower before using the rotary tiller, he can save time and power and prevent the soil from being too finely broken down, as often results when an attempt is made to cut up heavy top growth by rotary tilling alone. Where corn follows corn, one rotary tiller pass with speed adjusted for a long cut usually leaves the ground in a desirable rough cloddy condition. Weeds are allowed to sprout and are then killed in a final light rotary pass just ahead of the planter. Deep burying of weed seeds, which usually germinate years later if moldboard plowing is practiced, is avoided.

For Rickman, rotary tillage doesn't demand that large acreages be prepared ahead only to have weather interfere. He can readily prepare a plot and plant it before preparing further acreage. The trash is too finely cut to clog planting equipment; absence of air pockets in the seedbed aid even germination; the abundant humus hastens plant growth and minimizes surface crusting; sponginess of the soil is increasing while washing has been almost eliminated. Rickman is no longer concerned about soil preparation on the contour on hillsides, for with rotary tillage no water channel patterns are set up, as with plowing. Water entering the soil is compelled to take a diffused course and with its velocity reduced, erosion is minimized. Since the rotary tines give grab and thrust, steep slopes can be worked with minimum power, and under somewhat wetter conditions than would be possible with the plow, both from the point of view of traction as well as soil structure, for no plowsole pressures are developed.

No Breakdowns Yet

When Frank Rickman first tried rotary cultivation, rocks in the field had him worried. However, he found that his rotary tiller crawled unharmed over stones or other obstructions that used to break his plowshares. Earlier rotary tiller models, particularly before some of the newer metals were available, were subject to frequent tine breakage. Fast revolving tines, swinging in the air part of a circle and suddenly hitting hard, dry dirt, must be built to take a severe beating. Spring mountings, one of the original answers, prevented tine breakage, but resulted in out-of-the-frying-pan-into-the-fire nuisance of spring breakage. Better springs came along as the answer for some manufacturers. Others use slip clutches, rubber bushings or cam action shafts to allow tines to release or ride over obstructions, saving tines and preventing tine-to-soil impact from being transmitted throughout the machine.

Tine designs are endless, especially in garden tiller sizes. They range from hoe-like forms to narrow pick shapes and rooster-comb or buzzsaw mulching blades. Those that work well in Washington State or in bottom land might be useless in Virginia or in red siltloam. Seasonal conditions also call for tine selection, so most manufacturers provide for tine changes to meet circumstances. Some tines are designed for self-sharpening and others are particularly efficient as self-cleaners in eliminating the wrapping effects of stems.

When farm-sized tillers were first introduced, a great deal of their soil destructive reputation was due to excessive rotor speeds. At 300 to 400 rpm, heavy clay of low organic content was quickly ground into flour. Current models normally operate at much lower range or come equipped with selective sprockets or transmissions so that high speed is still available if wanted, as in land clearing.

The adjustable hood on farm models, and on some of the more rugged garden tillers, is more than a lid to control dust. Closed, it serves as a bankboard to break clods more finely and to bury trash, roots, or stones beneath the surface. Open, it produces a rough, cloddy tilth, with trash thrown wide as a surface mulch or with roots and stones left for gathering. Partly open, it gives intermediate effects. New England rocky-land farmers generally operate with the hood open, following tillage with a stone picker. North Carolina tidewater farmers reclaim wasteland with heavy Diesel-powered rotary models which first plunge, lid up, through thick growth of four-inch sapling pine and scrub oak, heavy with underbrush. The milled and chopped saplings and roots are flung on the surface of the pulverized soil to die. A second pass with the lid down buries the trash as fertilizer and leaves a fluffy seedbed for grass seeding.

Costs

Though he has no available figures to prove it, Rickman, like other rotary tiller owners, feels that time, fuel consumption, and other operating costs are substantially lowered by rotary tillage as against conventional seedbed preparation involving frequent changes of implements during plowing, discing, dragging, and harrowing. Annual write-off is high, for rotary tillers require rugged, costly construction. The trailing 70-inch power-take off model Rickman uses cost $1275. By removing the center tines, some two-row sizes may be used for row cultivation. Lift type 50-

(*Continued on page* 119)

Milk Without Grain?

By Charles R. Koch

DURING those rare times a dairyman has a moment to indulge a dream, he closes his eyes and sees brimful cans of milk produced solely on roughage. He raises no grain and he buys none and his pockets are full of money. Then he snaps back to reality and admits he is still a country mile away from this happy situation. Yet, those who have been making top quality hay and silage are beginning to realize that some day, not too many calendars removed, a good many dairy farmers may be producing milk on a 100 per cent roughage ration.

When will this be? Five years? Ten years? That's hard to say, but right now there are dairymen who have cut way down on grain and still kept production up.

Dairy farmers are finding the unfavorable price differentials between grain and milk a real spur to search out new and more efficient ways to feed their cows; and the advanced methods and machinery for making hay and silage are giving them the tools for putting up the protein packed, high quality roughage that is one of the answers to their problem. One of the answers, mind you. For while roughage with all the punch and palatibility of lush pasture is fundamental, there is another important item, too—the kind of cow that can thrive and make milk on a straight roughage ration. When the day comes that these two factors can be combined, the dairyman's dream will be fulfilled.

Ned Arnold is a fellow who is convinced of that. On the official DHIA records Ned is listed under his legal moniker, L. N. Arnold. His address is Winder, Georgia, a spot along U.S. 29 between Atlanta and Athens which has become familiar to increasing numbers of southern dairymen who have been beating a path to his barn to try to learn his formula for producing milk. The records say he does it cheaper than any other dairyman in Georgia—$1.56 per hundred pounds was the total cost of his feed, his average for his last full year of testing. To Arnold the formula is no secret. "Just give your cows good pasture and good silage and they will give you milk," is the way he sums it up. Notice he doesn't even mention hay. That's not because he has anything against the dry roughage. He just hasn't been able to make or buy the kind of hay he considers of proper quality for his cows for the past few years so he has been getting along without it. "Hay gives variety to the ration," he says, "but if you can't get the right kind, the cows will get along all right on silage alone."

A look at some of the figures in his DHIA record will show the economy of Arnold's milk production. For his last full year of record his herd of 28 cows, predominantly Holstein, turned out 239,072 pounds of 3.4 per cent milk, an average of 8,538 pounds per cow. Nothing exceptional about that, you Wisconsin folks will be inclined to say. But remember, this is in the deep South. That 8500 pound average is almost two and a half times the state average. To produce this milk he fed, besides pasture, an average of 8.36 tons of grass silage per cow and 618.7 pounds of concentrate which included 241 pounds of beet pulp. With this kind of ration his concentrate-milk ratio was a big, wide 1:13.4 and he finished the year showing an income above feed costs of $403.92 per cow.

Southern Silage

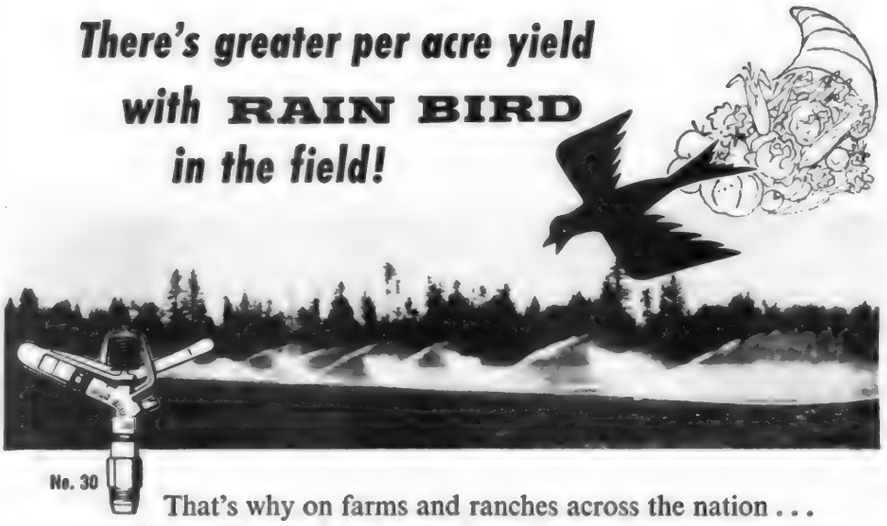
Those are the results. Here is the way he does it. His 200 acres are strangers to row crops. "The last crop of corn I tried to grow cost me $10 a bushel," he recalls painfully, "and I got nothing but nubbins, at that. We don't get enough rain at the right time to grow corn down here unless a fellow wants to go to irrigation. But why grow the stuff when grass will do the same job for you?"

In August, Arnold sows what he calls his winter temporary pasture. This is a mixture of oats, rye, crimson clover and

(*Continued on page* 74)

Changing a cow over to a roughage ration is tricky business. This cow seems to be ready to make a deal: "More grain, or I won't let down the milk." But the trend to more and more roughage feeding continues. Big, self-unloading wagons like the one below are cutting the costs of making grass silage and improving the quality of the feed, no matter what kind of weather turns up at cutting time.

There's greater per acre yield with RAIN BIRD in the field!



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MILK WITHOUT GRAIN?

(*Continued from page* 72)

rye grass which he broadcasts at the following rate: 3 bu. oats, 1 bu. rye, 20 lb. crimson clover, 20 lb. rye grass.

The mixture is given a start with 500 pounds of 4-12-12, gets a boost with about 150 pounds of nitrate of soda in the fall and again in the spring. The cows will get 4 to 5 months grazing off this pasture—from October or November to the first of March—then they are taken off for a spell and along about the middle of April Arnold gets a crop of silage off the field. Ten tons to the acre is what he usually expects. He cuts as early as possible—before the clover has shown much in the way of blossoms, say before the 1/10 bloom stage—to insure a high yield of protein. He adds sodium bisulfite as a preservative, 8 pounds of bisulfite to a ton of silage.

Arnold's silage is so odorless that he feeds it in the barn during milking time with no fear of flavoring the milk.

After Arnold gets his winter crop off the field he'll disc it up and sow some Tift Sudan grass at the rate of 25 pounds to the acre, starting it off, too, with a dose of 500 pounds per acre of 4-12-12. By cutting the Sudan before it heads and by top dressing after each cutting, he will get 2 or 3 crops of silage from this seeding before the day arrives to disc it up and go back to the winter mixture.

Sid Diamond, Dairyman at the University of Georgia, who has been working closely with Arnold the past few years, likes to point out that recent studies indicate that it takes about 4½ pounds of grass to make a pound of milk. If this is so, he asks, what is an acre of land worth which will graze 2 cows during the winter and turn off 10 to 15 tons of silage spring and summer? Down in Georgia, where they were getting around $6 per hundred for milk this summer, even a mere 2 tons of silage could be converted into a return of $53 at this rate. That takes quite a bit of the chill off the estimated $30 an acre cost of making top meadows.

Winter temporary and Sudan are not the only tricks in Ned Arnold's satchel. He feeds silage almost the year round with the exception of a period during the winter when his pastures are at their peak, and that calls for a lot of silage. This past spring was a disastrous one for the entire south and particularly for Georgia. The

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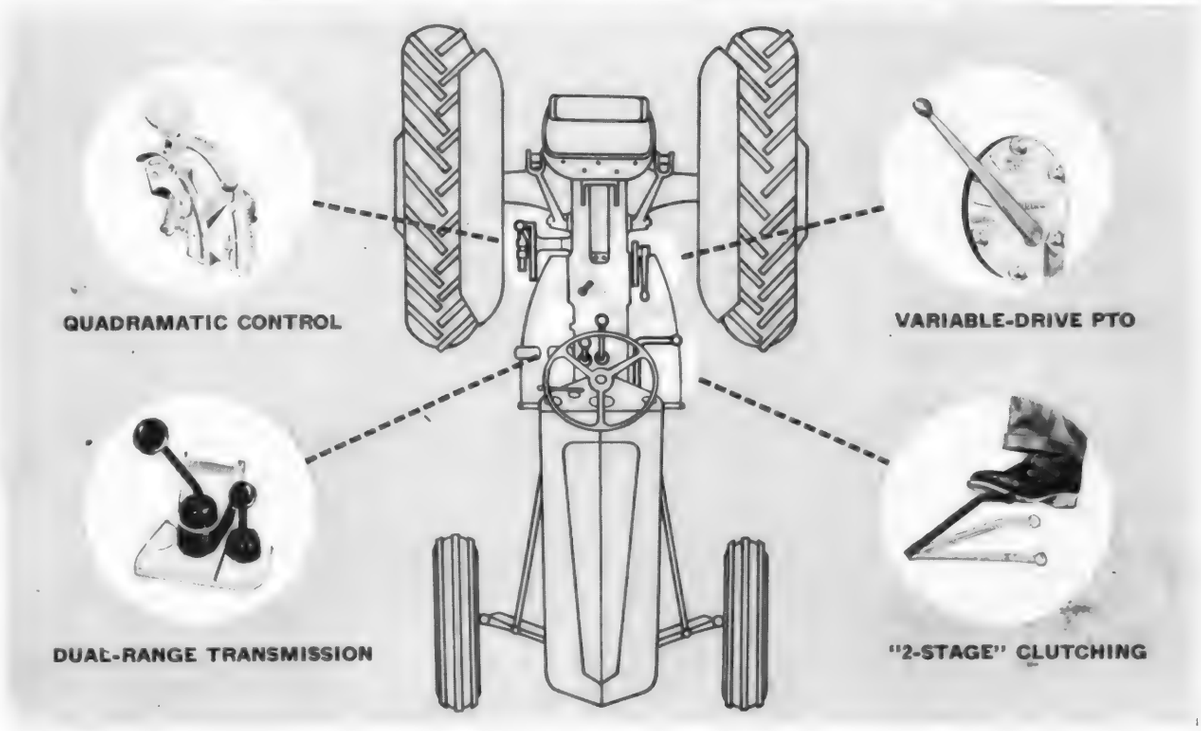

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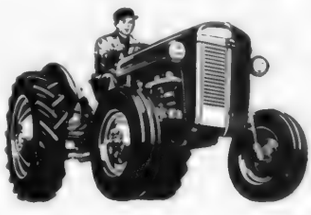

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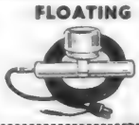

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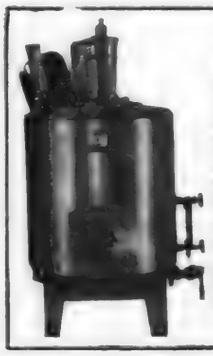
bitter cold snap at the end of March froze out all the clovers just as they were coming into their own. This, Arnold figures, cost him at least 200 tons of silage. He fell back on oats, however, cutting 50 tons from a 12 acre field the middle of May, 60 days after they were seeded. He has 30 acres of milo and millet and some soybeans and milo coming along to back up his Sudan grass. With just a little break in the weather he will have plenty of silage to dish out the 30 to 60 pounds a day to which his cows have become accustomed.

For the little concentrate he does feed, Arnold likes beet pulp or citrus pulp, which is a relatively cheap feed.

New Model Cow

Ned Arnold's story is only one part of the roughage feeding picture. As was pointed out, the door to success in this venture is secured with two locks. Top quality roughage is the key to one of them. The other key is the right kind of cow. It is not every cow that can handle large helpings of silage and hay and hit her stride in the milking parlor without the assistance of a sizeable portion of grain. For generations dairymen, particularly the breeders of seed stock, have been pushing their cows for high records, frequently with a hang-the-expense attitude. If Mable's Glory of Feedmore Acres needed 25 pounds of grain a day to make her record, let her have it. Tie down the safety valve, boys, and stoke the boilers! Daughters of this kind of cow have always been in demand, but there was certainly no attempt made here for selection on the basis of roughage handling ability. So we find all the books saying that cows can't produce milk on a straight roughage ration and still maintain weight.

The only thing wrong with this idea, according to Dr. D. L. Hill, of Purdue's Dairy Department, is that "the cows haven't read the books." The dairymen and nutritionists at Purdue have been doing some fantastic things with cows and silage the past few years. Dr. N. S. Lundquist and his associate, Dr. Hill, are originally from the state of Washington, where grain, particularly corn, is much too valuable a commodity to be wasting a lot of it in cattle rations. When they came to Indiana a few years back they found it hard to understand the fondness for corn which seemed to be ingrained in the Indiana cow and her owner. But they also found there were



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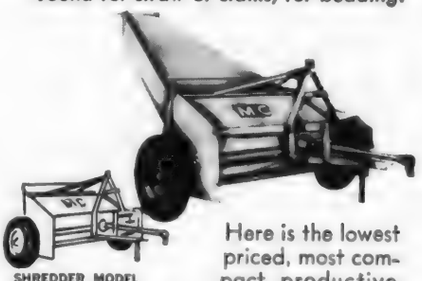

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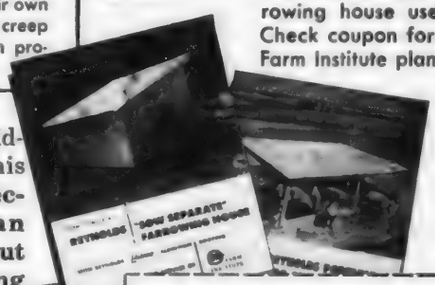

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some of these dairymen who were far from satisfied with their own methods. One man with a 12 cow herd which was producing over 500 pounds of butterfat walked into the Dairy Building one morning to ask Dr. Lundquist to diagnose his trouble. Somewhat amazed, Lundquist assured him any troubles he might have were with something other than his herd. But the man's complaint was that he was paying $84 per cow per year to the elevator and he figured there should be some way he could save a large part of that annual $1000 bill. The only answer Lundquist could offer was better roughage and a new model cow to handle it.

For four years one of the Purdue experiments has been directed at finding out how much roughage a dairy cow can handle and what use she can make of it. Wide variations have been discovered in the ability of the cows to consume and utilize the forage. Alfalfa, alfalfa-brome and alfalfa-Ladino-brome, were cut in the pre-bloom stage and ensiled with a preservative—ground corn, molasses and sodium bisulfite were found to be equally good. One 1200 pound Holstein on this straight silage diet for 21 weeks ate an average of 144.8 pounds of silage a day (38.66 pounds on a dry matter basis, better than 3 pounds of dry matter per 100 pounds live weight of the cow). One day she ate 192 pounds of silage. She averaged 33 pounds of milk a day and gained 259 pounds while on the test.

A smaller cow, a Guernsey weighing 942 pounds at the start of the test, ate 113.1 pounds of silage a day (exactly the same amount of dry matter per live weight as the Holstein), gave 24.5 pounds of milk and gained 14 pounds.

In a more recent test for which the records are not yet complete, the Holstein hit a high in consumption of 193.5 pounds of silage for one day, averaged 40 pounds of milk and held her weight.

Another little Guernsey in the herd was able to eat only 83 pounds of silage a day, gave only 20 pounds of milk and lost 14 pounds body weight during the 21 weeks.

Similar variations were found in the way cows could handle hay made from the same field as the silage. One Holstein packed away 44.4 pounds a day and gained 100 pounds while she was making an average of 33 pounds of milk. Another put away 39 pounds of hay a day but made only 14 pounds of milk while gaining 132 pounds in body weight. Obviously, if a man wants to go in for roughage feeding he is going to have to steer clear of this kind of cow.

Prompted by a Purdue experiment, dairymen are already asking some embarrassing questions about developing and maintaining lines of cows that are real roughage handlers. For example, there is the farmer up along the Columbia River in northwest Oregon, who, with a herd of 50 grade cows has been averaging better than 11,000 pounds of milk and 400

pounds butterfat with, as he puts it, "only enough millrun to bring them into their milking stalls—not more than two pounds a day." Finding that his breeding was getting too close he tried to introduce some outside blood into his herd last year with a new bull. "But believe me," he says, "this is a hard thing to do. You can't find the kind of stock we are after in this country—roughage stock." This man from the outset has had his sights set on a herd which would average 12,000 pounds of 3.5 per cent milk.

Dairymen who have once followed an all-roughage or a close to all-roughage feeding program find it difficult to go back to grain feeding. Nelson Price, in northern Ohio, recently moved his herd of registered Holsteins to a new farm where he is trying to establish a grass-land program like the one he had been following. In the meantime he has his herd of 12,500 pound cows on a 1:6 grain-milk ratio, a ratio most farmers with that kind of average would consider extremely low. But not Price. His 26 cows and 12 heifers are now eating 1¼ to 1½ ton of silage and six 60 pound bales of hay a day besides their appetizer of corn and cob meal, oats and dairy mix. When he gets the whole farm down in grass there will be some changes made.

Price, like a lot of dairymen, believes a low grain ration keeps a cow from "burning out." He feels he has less udder

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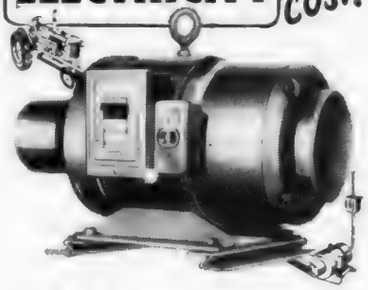

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machinery storage—equipment is fully protected in tough, weather-tight Butler buildings. Reduces maintenance. And it's always ready to go. Big doors let you get machinery in and out fast. Post-free interiors make it easy to maneuver big equipment. And for a dollar-saving . . .

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trouble and much less trouble in getting his cows settled. The hard and fast scientific proof for this belief still seems to be lacking. The men who are closest to the problem won't say it isn't true.

Roughage Feeding Facts

Here is a summary of some of the facts which must be faced by every farmer who would like to increase his roughage rations:

1) Nothing less than *excellent* roughage will do.

—Ned Arnold found he can't put up good field chopped hay without a barn drier, so he went completely to silage.

—Clarence Draeger, a highly successful Wisconsin roughage feeder, says, "In traveling through the country I find that too many farmers are still feeding poor quality roughage. I dread to think of them discontinuing grain feeding."

—Dr. Lundquist, at Purdue, points out that farmers still look upon grass silage as a way to save the crop. "They are going to have to change their whole attitude," he says, "and start thinking about making grass silage, period. In most sections they should have it in the silo before it rains."

—From Mulhocaway Farm, at Clinton, New Jersey, L. B. Wescott reports "The most significant change in our farming operation was the installation of a wagon drying outfit for baled hay. We have improved the quality of our hay 100 per cent and this is reflected in our production and in decreased feeding of grain and beet pulp. It is the most important single change in my farming operation, including the change to hybrid corn."

—And out on the west coast, H. B. Howell, Superintendent of the John Jacob Astor Branch Experiment Station, Astoria, Oregon, says the greatest mistake in silage making is to permit the grasses and legumes to get too far advanced in growth.

2) Heavy fertility is important. High yields of fine forage can't be produced on fields starved for any of the essentials.

—Dr. Robert Lush, down at the University of Tennessee, says you don't have to hold back on the nitrogen on a grass legume meadow for fear of making the legumes "lazy." It is shading by the tall grass that hurts the legumes, according to Lush. Keep the grass grazed or clipped and you'll have no trouble with legumes. There's another advantage in short grass, too, he says. Grass which is kept down to 3 or 4 inches is low in fiber and makes better forage.

3) Don't try to push the roughage into cows which lack the capacity to handle it. This may be the big obstacle to increased roughage feeding at present. It is no reflection on any particular breed. Within every breed there are wide variations of cows with the ability to handle roughage. Standards of selection which place a premium on roughage handling ability will uncover the kind of cow which has a place in this program.

4) Watch carefully the mineral require-

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You're in the farming business to make a good living. That's why we think you'll be willing to gamble one minute and two or three cents postage to find out how we can help you improve your income—in just a short time, and without putting up a big amount of money. We don't make any claims that our C&L Silver Shield Silos, Grain Bins and new King-Size Silo-Type Cribs are going to double your farm profits next year—or any year. And the same holds true for our line of C&L Buckeye Cribs and Bins, too.

We do say, though – and we can prove it —that the average farm *can* net $1,000.00 a year more with good silage and a leak-proof, airtight, C&L Silver Shield Silo to store it in. And we can show you plenty of new cars, new kitchens, and new farm improvements that wouldn't be there now if it weren't for everyday smart use of one or more of our other advanced-design C&L storage buildings.

As it says in the headline, you *can* actually pay the entire cost of your C&L farm storage building in just one season from the extra income it can add. Certainly, it's not unusual to have owners pay for them from added profits in two years time. Plenty of people have done it, are doing it, will do it. You can be one of them.

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HERE'S WHAT LAWRENCE B. SMALL, WHEATLAND, INDIANA, SAYS: "My corn profit paid for my Buckeye Corn Cribs in the first year. I found them easy to erect, absolutely rat-proof, and am well satisfied."

HERE'S A STATEMENT FROM E. G. GALLREIN & SONS, PLEASURE RIDGE PARK, KENTUCKY. "We are well satisfied with our Buckeye Bins. Last year we figure we lost $1,500.00 by having to sell our grain at low market. This year we have made about $1,800.00 extra, or nearly paid for the three bins and drying equipment in one season."

AND HERE'S WHAT DARVIN D. MEYER, VINCENNES, INDIANA, WILL TELL YOU: "In 1954 at combine time, wheat was $1.75 per bushel. By storing wheat in a Buckeye Grain Bin on a government loan I got $2.32 per bushel which more than paid the entire cost of storage."

You may even have a neighbor or a friend who can back up what they say. C&L owners are everywhere—and they're making money.

It's no accident that C&L silos, cribs, and bins have such outstanding performance records wherever they're erected. They're the result of years of leadership in their field—*plus* latest step-ahead design features—*plus* careful workmanship that's hard to equal anywhere. They're built to make you more money . . . and they do.

All C&L farm storage units are easy to buy—easily financed. All are simply and quickly erected—you can do it yourself, or your C&L dealer can include it in the deal. All are fully guaranteed.

Space won't let us tell you even half the story on any one type of C&L crib, bin or silo in this ad. That's why we want you to send for all the information—the whole story. And don't wait, either! Even if you don't need your new silo or other storage building until next spring, for instance—get the facts from C&L now. It makes sense—good sense, to have the facts on hand.

How about it? Send in this coupon now, or drop us a postcard. Get full information on the C&L structure or structures you're interested in. We'll rush all the facts and figures at no cost, no obligation of any sort. The pennies you use for postage can well be the best you've ever spent. So do it now—send the coupon right away.

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BUCKEYE BINS

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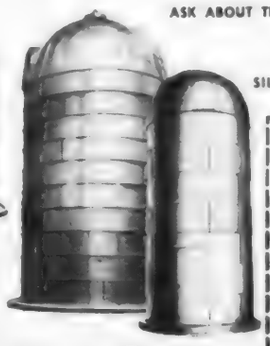

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☐ SILVER SHIELD GRAIN BIN ☐ BUCKEYE BIN ☐ BUCKEYE CRIB

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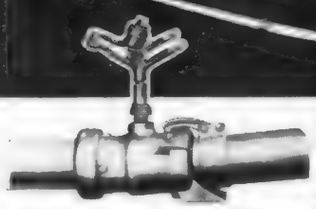

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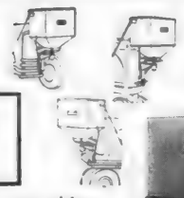

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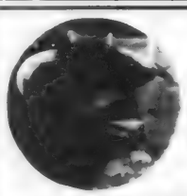

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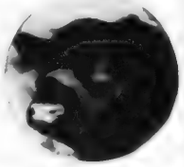

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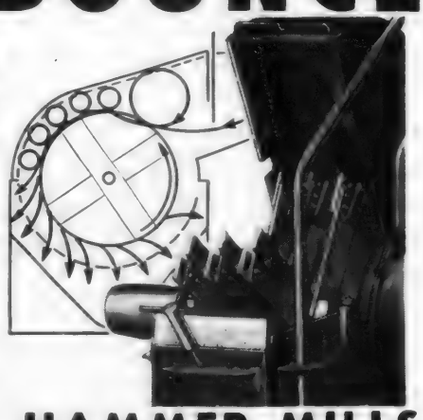


PAPEC HAMMER MILLS

ments of cattle on a high roughage ration. In some areas they may suffer from a lack of phosphorous and other minerals.

—The Gustafson Brothers, who milk a herd of registered Polled Milking Shorthorns near Cadillac, Michigan, followed an all-roughage program for two years with remarkable success. But they found their calves were suffering from a lack of minerals. Their soil is low in available phosphorous and cobalt and the cows apparently were not eating enough minerals and steamed bone meal free choice.

Dairymen now have the tools for making top roughage. Give them a little time and they will soon be turning out roughage which will make today's hay and silage as obsolete as a horsecollar. When breeders give them the cow to utilize this new feed, the new day in dairying will have dawned.

DRINKING WATER FROM PONDS

(*Continued from page* 62)

in this compartment is controlled by a float switch. As treated water is used, the float switch kicks on both the pond pump and the disinfectant machine, causing an overflow from the first compartment until the storage reaches a point where the float switch cuts off both pump and disinfectant.

An ordinary household pump arrangement with standard pressure tank draws water from the second compartment of the cistern as needed. Before reaching plumbing fixtures, the water passes through two filtering tanks, first a sand filter, then a carbon filter. The result is a sparkling, clear water, good to the taste and safe.

In most farm water-treatment layouts, if chemical disinfecting is practiced at all, it follows filtering through some sort of sand filter. The purifying chemicals which are added give an objectionable taste and odor, which can only be removed by refiltering. Disinfection before the initial filtering, though requiring more of the chemical, is often standard city waterworks practice. The chemical flavor is then removed in the filtering process. By using the city method, Williams accomplishes several purposes. The need for refiltering to remove chemical taste is eliminated. Also, with disinfectant introduced into the holding cistern ahead of filtering, the germicide is in longer contact with bacteria, effecting a better "kill" than would be possible if the chemicals were mixed in the pumping process as is often done.

Proper dosing with chlorine, available in the form of laundry bleach at any grocery, is the cheapest and easiest method of killing germs in water for drinking. Chlorine, in bleach form, or as hypochlorite tablets, or as chlorine gas, is universally used in water purification. Dosage must be even, constant and accurate. Batch purifying of water in holding cisterns, with a quantity of chlorine bleach poured into the water, is recommended

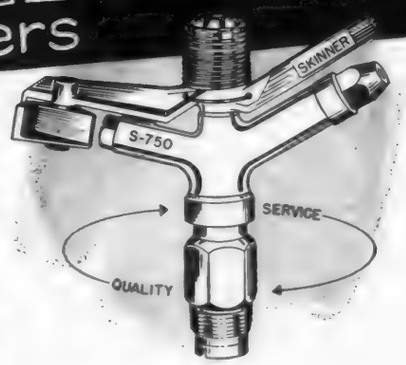
only as an emergency measure. On the average farm, this chore is too easily neglected, often inaccurate and seldom timed to prevent recontamination. The U. S. Department of Health Joint Committee on Rural Sanitation states, "If the raw water is potentially dangerous, only uninterrupted disinfection will assure its safety."

For long term reliability, only by some type of metering machine can the correct small amounts of chlorine be safely added to the water to render it drinkable. Too little chlorine might not kill all the bacteria. Too much chlorine, though not unhealthful, gives poor taste and odor. A carefully designed and properly installed metering machine not only gives rigid control over the amount of chlorine injected into the water, but also causes the chlorine to be in contact with the germs the needed number of minutes to bring about the complete disinfection of the water. Scientists now consider 30 minutes the minimum retention time for the chlorine to be in the water to kill all germs. With this in mind, the size of the Williams' holding cistern and the maximum capacity of his pump have been kept in proper relation, so that the water supply is not drawn on before the chlorine has had time to act.

City water plants use chlorine dosing machines, called chlorinators, costing thousands of dollars. Family type chlorinators, of which there are a number on the market, range from $40 to over $400. The more expensive ones are precision-

Over 50 years manufacturing
sprinkler irrigation equipment

SKINNER sprinklers



. . . for over 50 years, The Skinner Irrigation Company has been manufacturing irrigation equipment for everything that grows—from equipment scientifically designed for the delicate humidifying of orchids to equipment built for the rugged requirements of banana and sugar cane plantations.

Through this entire period, all Skinner equipment has been designed and manufactured on the premise of distributing water uniformly and in the most effective and efficient manner—a premise that has established a 50-year-old reputation for integrity, quality and know-how.

Skinner agricultural sprinklers of today are a direct result of this vast experience. You buy them with confidence because they are . . .

- Field tested under field conditions
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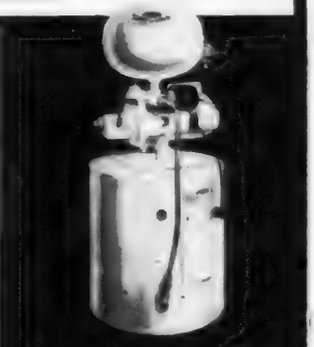

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Saves us money . . . this pipe will still be on the job when you take over.

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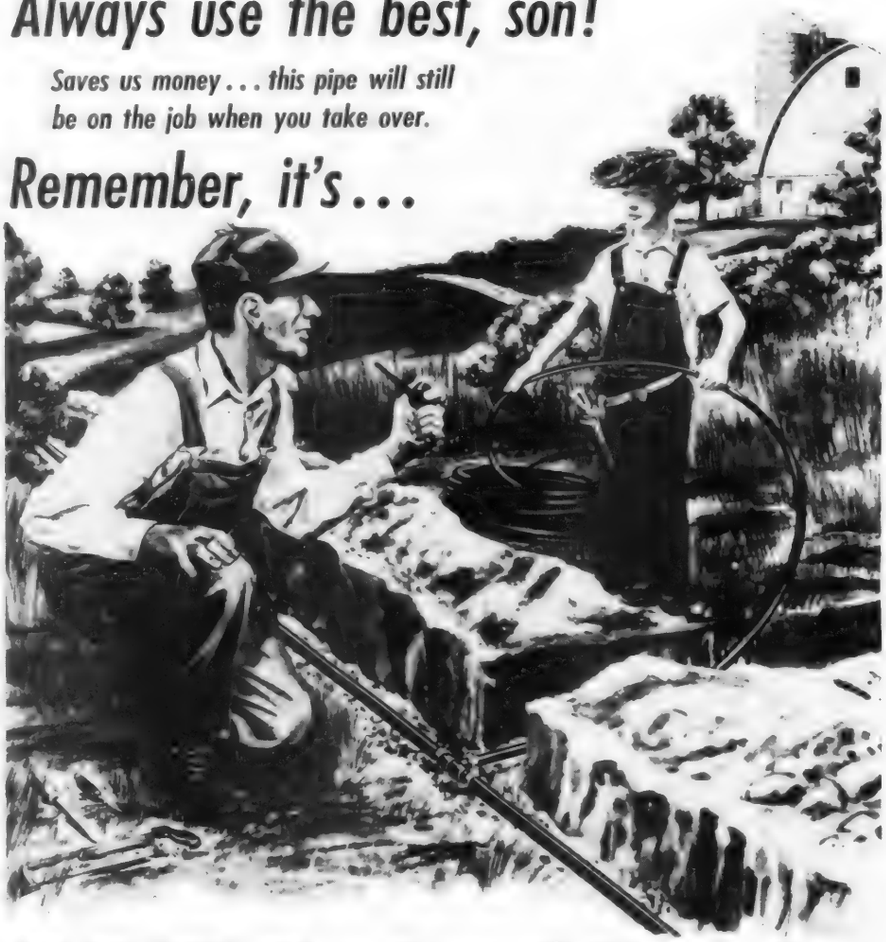

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Yardley *ClearStream* PressuRated Plastic Pipe was developed for farm water systems . . . the first fully pressure-rated pipe made for this use.

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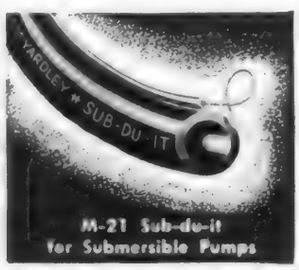
Yardley ClearStream comes in 75-lb., 100-lb. and 125-lb. working pressures in all six sizes from ½ inch to 2 inches. Every length is guaranteed to meet rated pressure requirements with a substantial safety factor. Easily and quickly installed with a few simple tools. Long lengths and flexibility reduce the number of fittings . . . and once it's in, it's there to stay. It never rots, rusts or corrodes. Available through your dealer in lengths up to 400 feet. Look for the pressure rating and the ClearStream name stamped on every length and package. For service lines or pump pipe insist on genuine ClearStream. Send for literature.

Look for this Identification on every package and reel.

M-22 Twin-du-it for Jet Pumps



M-21 Sub-du-it for Submersible Pumps

YARDLEY PLASTICS CO., 142 Parsons Ave., Columbus 15, Ohio

In Canada: DAYMOND CO., LTD., Chatham, Ontario — Export Sales: F. & J. MEYER, 115 Broad St., New York 4, U.S.A.

built to accurately meter fractional parts of chlorine per million parts of water without undue chemical corrosion year after year. They must be constructed for easy adjustment to the sensitive variations in the chlorine demand of water from week to week. Some operate by water pressure, others by electric motors or solenoids. All of them can be installed to render automatic service by operating from the same switch that starts and stops a water pump. None are much larger than a gallon oil can. Their only purpose is to draw very small amounts of bleach or similar chlorine solution, usually stored in a crock or jar nearby, through a plastic tube and to feed the chlorine solution through a discharge tube into the water system.

Daily operating cost of a chlorinator is low, for a 60 cent gallon of bleach will disinfect over 40,000 gallons of water. A quart of bleach will treat the entire water supply in an average household for over a month. Generally, one or two parts of chlorine bleach to one million parts of water is sufficient to kill all harmful germs, but surface water, especially, varies in its chlorine demand from season to season. Average dosage is not sufficient when a pond becomes muddy from rains. So chlorinators require frequent adjustment to supply more or less bleach as the need arises.

Chlorine is used up in killing germs. There is only one quick test for determining if all the bacteria are destroyed. More than enough chlorine is added to the water, so that after 30 minutes, by which time all germs should be destroyed, unused chlorine still remains in the water. The purity of the water for drinking is determined by measuring the leftover or residual chlorine. Testing kits come with the chlorinators.

It takes Williams only a few minutes once a week to be certain his water is safe. He adds a drop of testing chemical to a sample of chlorinated water. If a yellow color develops, sufficient residual chlorine is present and the water is within safe drinking limits. If no color develops, more chlorine is needed and the chlorinator knob is set ahead. If an orange or red color develops, the knob is set back to reduce the amount of chlorine injected. Lack of a chlorine smell to treated water (before filtering) is itself a danger signal that not enough chlorine is being applied.

One new type of family chlorinator op-

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Do More—Cost Less

Model G-3 shown lists at only $137.50 F.O.B. factory. Fits Ford, Ferguson, John Deere 40, Oliver 55, etc. Easily mounted or removed by one man in less than 5 minutes. Raised and lowered on tractor hydraulic lift while driving from the PTO shaft. Mixes concrete, mortar, feed, innoculates seeds, prepares hot house and cold frame soil, etc. Mixes in transit or stationary—as you wish. Other types and sizes also available. SEE YOUR IMPLEMENT DEALER TODAY! . . . or write to . . .

R. L. FROHRING MACHINE CO., BOX G, NEWBURY, OHIO

erates on the principle of water purification which is used on some steamboats and trains. After an initial test and setting of the machine, no further adjustments are required, for a high overdose of chlorine is injected into the water so that a safe kill is effected. This is known as superchlorination, a theory to which some engineers object. A carbon filter, placed on the drinking line only, removes any excess chlorine that might otherwise cause disagreeable tasting water. The carbon cartridges of the filter are of the replacement type. This two unit system, with a year's supply of cartridges, costs under $100.

Another device newly on the market for water treatment uses ultra-violet rays instead of chlorine. This $80 machine, smaller than an electric toaster, can be attached to any supply line which is used for drinking or cooking. It functions by exposing the flowing water to a small germicidal lamp. The ultra-violet rays cause no undesirable flavors or odors and offer the extra advantage of presenting no chance for overdosage. Tests show badly contaminated water can be made safe with this device, but it is too new to have received widespread approval. Cloudy water, dirty reflectors and low water temperatures cut down the lamp's germicidal efficiency. There is as yet no quick home method of checking the treated water for purity.

Water from protected ponds can produce a clean supply for domestic laundry and lavatory purposes if first passed through a carefully designed and maintained sand filter. Various types are used, from simple sand-filled barrels or block cisterns within the pond itself to long trenches or large cement tanks of sand through which water is allowed to seep. Recommended designs and sizes of such filters differ.

Most investigators feel that under average farm conditions, home-made sand filters are not consistently reliable. The scum and dirty sand in the top layers of the filter must be raked or removed and replaced frequently to prevent the filter from slowing down the supply. Neglect can also cause the filter to become a breeding ground for harmful bacteria, defeating its purpose. Maintenance is a never-ending, dirty job.

Joe Williams found that the construction costs of an adequate outdoor sand filter would run at least $100 and more

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PORTABLE FEEDING DRAG

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SELF-PRIMING DEEP WELL JET PUMP

It's the greatest advance in pump engineering since Jacuzzi invented jet pumps. It's designed for wells to 400 feet. Hundreds already in use throughout the United States and Canada. Don't settle for less.

New — Makes your well a satisfactory producer regardless of sand, gaseous water, low capacity or changing water levels.

New — Eliminates all those common causes for breakdowns. Reprimes itself automatically after electric power failure. Shuts itself off whenever water level drops. Cuts power bills.

New — Has all working parts above ground within easy reach. No motor or mechanism down in the well to clog with sand or burn out if your well gets pumped down.

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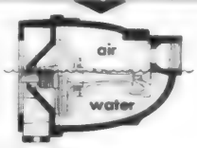
BARNES

SHALLOW-WELL JET WATER SYSTEMS

Only Barnes Offers You These 3 Advanced Design Features!



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Your pump will never lose prime even if water level draws below foot valve or well goes dry. Large air handling capacity and water storage for self priming up to 25 ft. suction lift.

SOLID BRONZE PUMP UNIT

Solid rustless bronze impeller, impeller housing and jet for years and years of dependable pumping.

U-CUP SEAL

Neoprene impeller-seal gives lifetime service . . . no unnecessary recirculation . . . increases pump efficiency and eliminates wear-rings.

There is a Barnes water-system to meet your requirements . . . choose from a complete line of 232 models!

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Barnes Mfg. Co., Dept. F. F.
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☐ Shallow Well ☐ Deep Well Pumps.
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like $200. For no great additional cost, he was able to set up a small industrial type filtering system which takes up only a few feet of floor space in his utility room and assures him of quality water with minor maintenance. If you have a pressure system, a filtering and purifying system can be installed for about $500.

His chlorinated water from the holding cistern is pumped through two tanks, each not much larger than a home hot water tank. The first tank, containing quartz, removes dead bacteria and algae, silt and similar impurities. Such tanks can be provided with filter media for iron, organic materials and other matter in suspension, as well as for chemical removal of other objectionable properties, such as acidity, according to the nature of the water. One filtering material, diatomaceous earth, the skeletal remains of prehistoric algae mined on the West Coast, was popularized as a lightweight, effective filter aid by the army during the war. It is highly capable of filtering microscopic particles, including removal of 95 per cent of live bacteria and is said to remove some bacteria which chlorine cannot kill.

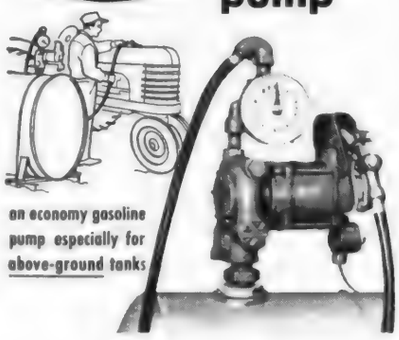
In the Williams' system, the water finally passes through a tank containing activated charcoal, which completes the filtering of finely suspended material and takes out chlorine odor and flavor. The water emerges sparkling, safe and potable.

Tank type sand filters cost from $92 up for those of smaller capacity. Tanks of involved design for use of diatomaceous earth or other material for specific filtering run upwards of $300. Activated charcoal filters begin at $35 for under-the-sink cartridge types with tank styles costing from $64 to over $300.

Tank care is no problem. Joe Williams used to backwash his tanks once a month. He found that by flushing out the silt that formed on the top of the quartz filter, he was reducing its effectiveness, for a few inches of silt aids filtering. The filters usually work well for about three months before requiring attention. Whenever chlorine odors remain in the water lines, Williams reverses the flow of water in the charcoal tank by a set of valves. Dirt in the charcoal is flushed out a drainage outlet. When water pressure in house faucets drops too low, backflushing of the quartz filter is indicated. It takes about an hour for his water pressure, which is set at slightly higher than normal for better flushing, to completely clean both filters. The activated charcoal is expected to last 3 or 4 years, with the quartz needing replacement in perhaps 5 years. In his case, replacing the filtering materials would cost from $50 to $80 per tank.

It may seem that pond water is expensive drinking water for the Williams family, but Joe feels that his pond and water plant represent not only an investment in convenience, but in health insurance as well.

TOKHEIM MODEL 44 portable electric pump



an economy gasoline pump especially for above-ground tanks

This new portable pump—with its rugged ¼ h.p., 110-volt motor—takes the *work* out of fueling! Delivers approximately 10 g.p.m. Equipped with a self-adjusting sliding suction tube. For use on skid tanks, or with underground installations. Reduces fire and accident hazards—delivers gasoline directly to trucks, tractors or other equipment.

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This low cost implement breaks up and scatters cattle droppings. Finishes seed beds. Renovates old pasture land. Farmers swear by it. See your dealer or write for literature.

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Clear Brush, Fell Trees WHILE YOU RIDE!
NEW FRONT MOUNTED TRACTOR SAW

CUTS BOTH HORIZONTAL AND VERTICAL

Operator controls Saw from Tractor Seat. Cuts Brush at 2 M.P.H. . . . Trims Hedge . . . Fells and Bucks up to 24-in. Trees. Tractor Power makes Sawing Faster and Easier. Fits most Popular Tractors.

Send Postcard Today for FREE FOLDER and Prices.
BELSAW IMPLEMENT CO., 4016 Field Bldg., Kansas City 11, Mo.

LIABILITY INSURANCE

(*Continued from page* 43)

age to Property" insurance, but is more accurately described as "moral obligation" or "good-terms-with-neighbors" coverage. It costs $2 and provides for payment of damage to property of others, with no reference to *liability*, up to $250 per occurrence. Since the basic policy does not cover intentional damage, this feature would still be a source of argument over damage done by the kids to the neighbor's property, but the endorsement used by most companies eliminates the exclusion as to intentional acts of children under 13.

Some Farms Are Special

There are three types of farms which do not qualify for the farmers comprehensive personal liability policy: (1) Those which are more like factories than farms, such as those which operate large freezing or dehydrating plants, or poultry factories. (2) Those which are devoted principally to raising or using race horses, and (3) farm corporations. If a corporation owns a farm, or a farm is incorporated, a comprehensive personal liability policy is not available for that farm. These types of farms are not just out in the cold for ordinary comprehensive farm liability insurance, but their insurance needs are somewhat more complicated, and, usually, they will spend somewhat more for protection.

Check List for Your Policy

Here is an abbreviated check list which will help the farmer determine whether his insurance is doing all he expects:

1. Do policy definitions of "insured," "premises," "business," "farm employees" and "residence employees" fit into your situation?
2. Are there any trucks, jeeps, or perhaps an unlicensed vehicle used only on the farm, on which you do not carry automobile liability insurance? If so, does your farm liability policy cover these in all situations in which you will use them?
3. Are you or any resident members of your family employed at some other type of work besides farming? For instance, do you or any members of your family help out at the corner garage on Saturdays? Business pursuits coverage can be added for a small charge. If it's

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FREE 36 page booklet

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Box 35, Walpole, N. H. Tel.: Walpole 78

Branch Hatchery, Lancaster, Pa.

OLIVER *SUPER 55* TRACTOR uses VICKERS® HYDRAULICS to provide *SUPER VERSATILITY*

AUTOMATIC CONSTANT DRAFT CONTROL

AUTOMATIC IMPLEMENT POSITION CONTROL

When irregular ground or soil conditions tend to increase or decrease draft, the Vickers Servo Valve acts automatically to raise or lower the implement slightly. Movement is so smooth as to be almost imperceptible . . . with no sign of jump. Overloading, wheel slippage and stalling of tractor are prevented. Flipping a lever on the valve automatically provides constant depth regardless of ground contour or changing soil.

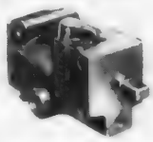
INDEPENDENT HYDRAULIC CYLINDER CONTROL

Addition of Vickers 3-in-1 Valve permits operation of pull-type and mounted equipment of all kinds independent of main hydraulic system but using same pump.

VICKERS SERVO VALVE

Provides smooth, accurate and instant response to load or position changes of hitch tools. It is mounted inside the oil reservoir and has an external lever.

VICKERS 3-IN-1 VALVE



Four-way directional valve with built-in flow control and relief valve is mounted externally to provide control for separate hydraulic system (front- or side-mounted equipment).

VICKERS PUMP

Hydraulically balanced and having automatic wear compensation, this pump delivers more oil while taking less power. A single pump supplies all needs.

The new Oliver Super 55 Tractor demonstrates to excellent advantage the many benefits that Vickers Hydraulics offer the farmer. On the Super 55, a Vickers valve and pump are used to provide the 3-point hitch tools with either automatic constant draft or automatic constant depth . . . at the flip of a lever. By addition of the Vickers 3-in-1 Valve shown at the left, a separate and independent control system can be provided for operating front- or side-mounted equipment. Built-in overload relief protects against damage, while merely turning a knob on this valve changes the amount of oil flow for fast or slow operation.

This is another example of the many ways in which Vickers Hydraulic equipment is working on the farm . . . helping make a wide variety of jobs easier, quicker, more economical. The next time you buy farm machinery, it will pay you to make sure the hydraulic units are Vickers.

***People who look for quality in tractors and farm equipment also look for* VICKERS.**

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The **POST** that gives you **MOST!**

With a 100 to 1 Guarantee to prove it*

Most EFFICIENT – easy to drive . . . makes fence building a simple one-man job.

Most STRENGTH – rolled from tough rail steel and reinforced on all four sides.

Most RIGIDITY – only Gold Crowns have shrunk-on Anchor Plates – no rivets – no holes – no welding.

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Most BEAUTY – Double baked green enamel finish with attractive Gold Crown.

Most SATISFACTION – Ask any farmer who has used them. He will show that pride and satisfaction which come from having the best at no extra cost.

Get the MOST for your money – buy Gold Crown Steel Fence Posts – *The Best in the Field.*

SOLD BY DEALERS EVERYWHERE

***100 POSTS FREE**

–if the Anchor Plate on any Gold Crown Studded "T" comes off in shipping, hauling, driving or pulling.

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GOLD CROWN *Steel* **FENCE POSTS**

BEST IN THE FIELD ©C.S.D., B-W CORP.

an owned business or one in which you (or any other member of the family) is a partner or an officer, that business needs liability insurance of its own.

4. Do you do any custom farming? This is not covered and should be arranged for specifically.
5. Your policy excludes liability for property damage resulting from the use of sprays or spraying. Check with your insurance man if you need extra specific coverage.
6. Do you have a boat? If it is under 26 feet in length and the motor develops not more than 25 horsepower, you can usually secure coverage at no extra cost. But, if you have a motor with greater horsepower, get a specific commitment.
7. If you own a plane, you need separate liability insurance.
8. Many of the routine service agreements you sign as a regular farm businessman contain innocent looking "hold harmless" clauses, as when an oil dealer installs an underground gas tank on your farm. These can put you on the spot for somebody else's liability. Before you sign any "hold harmless" agreement, check with your insurance man. He can provide coverage, if you feel you need it, but it's too late after an accident.
9. Are basic limits of coverage ($10,000 per occurrence and medical payments of $250 per person) enough? You can buy much higher amounts for relatively small additional premiums. If your farm has a value of around $50,000 and you've managed to put away some money, acquired some other property and prospered otherwise, a judgment of more than $10,000 is not unlikely.

Where To Get It

Any company which writes general liability insurance (and there are about 500 in U.S.A.) is empowered to write farmers liability insurance and most such companies do write it. There are few, if any, companies which specialize in farm liability insurance; and there are few companies which restrict their writings in that class.

Among the larger companies which write farm liability insurance are: Insurance Company of North America, at Philadelphia; Travelers Group of Hartford; America Fore Group of New York; Aetna Casualty Group of Hartford; Kemper Group (Lumbermen's Mutual Casualty) of Chicago; North British and Mercantile Group of New York; and Home Insurance Company of New York.

THE AUTHOR: Barney McMackin is assistant editor of the "Fire, Casualty, and Surety Bulletins", published by the National Underwriter, Cincinnati, Ohio, an insurance publishing house. He writes independently of any company or group of companies. Born in Pennsylvania, he was educated at St. Bonaventure College. He worked for several years before and after the war with a large insurance company in New York City, before assuming his present position. He is 31, married, and has three children.

DRY CROPS
Out In The Field!

By Ben L. Tomlinson

USE YOUR TRACTOR to pull and power this big-capacity Cropgard—the only all-portable farm dryer. Since no electricity is needed, you can safely dry corn, small grains —yes, even hay, right out in the field. Automatic temperatures and safety controls also operate off the tractor battery.

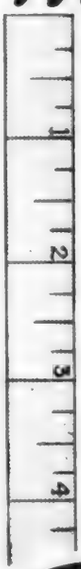
IMMEDIATE DELIVERY—on the job the day it's delivered, it's the best money-maker for custom drying. In one hour, you can dry 100-150 bu. shelled corn, soybeans or small grains. Costs less than 2c a bushel!

TWIN OIL BURNERS give a wide range of drying temperatures. A powerful fan forces a continuous blast through the 170 bu. capacity perforated floor.

PUT THE CROPGARD to work on your farm, budget-priced at $1985 FOB factory with running gear, hydraulic hoist and hay sides available as extras. If your implement dealer doesn't handle it, write to me for ***free, illustrated bulletin.*** Lakeshore Manufacturing Co., 3305 Republic Ave., Minneapolis 16, Minn.

MOULTON

systems *Measure up*



FARM TESTED
Tested by actual installations and operations for all kinds of crops, all kinds of soil . . . *all over the world!*

MECHANICALLY PERFECT
Engineered to be mechanically perfect. Complete with *folding carrying handles* and positive *non-leak gasket seal* and *welded-on Quick-Couplers!*

FIELD ENGINEERED
A Moulton trained representative inspects your fields and gathers all facts, figures and information about your problems, needs and plans for future expansion.

ECONOMICAL
Moulton has *built-in economy*. High portability, flexibility and simplicity of design assures you *greater coverage*, with *less equipment* and *smaller initial investment.*

FARM TESTED — MOULTON IRRIGATION COMPANY — WITHROW MINNESOTA

Ask about Moulton's NEW Finance plan!

WRITE DEPT. FQ-2 or see your nearest Moulton Dealer

POTASH—the quality element in your fertilizer

Without Potash—**there is no growth**

Without Enough Potash—**profits suffer**

How's the Potash Level in your soil?

The more you work your land, the more important it is to maintain its fertility level. Where continuous cropping and under-fertilization have lowered the amount of available Potash, *poor* crops and *poor* yields are bound to follow. Unit costs of production shoot up . . . and profits vanish. To conserve or increase the crop-producing power of your soil, you *must* return liberal amounts of Potash in your fertilizer. This vital, health-giving nutrient is indispensable to high yields and high quality. Your local agricultural adviser will help you determine correct amounts for your soil. But remember, a *low* Potash level means a *low* income level.

SEND FOR THIS FREE BOOKLET! Learn how to take soil samples . . . to determine the best fertilizer program for your crops, your soil. Photos and complete instructions show how, when, where and what is needed. For your copy, write to address below.

K_2O

Symbol for yield . . . quality . . . profit

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GRAND CHAMPION at the 1955 Ohio Angus Show

Grand Champion Prince G of MFS consigned by Milo Shaw and purchased by Hockland Farms. (Mr. and Mrs. Joe W. Hock, owners) Plain City, Ohio

Famous Angus Herd fed Sacco V-19

At the 1955 Ohio Angus Show and Sale, two top awards went to Milo Shaw Farms, Uniopolis, Ohio: Grand Champion Bull and Reserve Grand Champion Female (purchased by Robert L. Brown & Son, Sunset Bay Farms, Ontario, Canada.

All animals in Milo Shaw's fine Angus herd are fed Sacco V-19 Mineral. He says: "Sacco helps me keep my animals in top condition for show and for high sale prices." . . . You, too, will profit by feeding this complete, balanced mineral.

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BLUE LINE PRODUCT

BLUE EQUIPMENT MAKES BULGING BARNS

BETTER CROPS AT LOWER COST

with BLUE Anhydrous Ammonia & Solution Equipment

TRACTOR MOUNTED APPLICATOR with 3 type D spring trip applicators

Send for complete information

JOHN BLUE COMPANY, INC.
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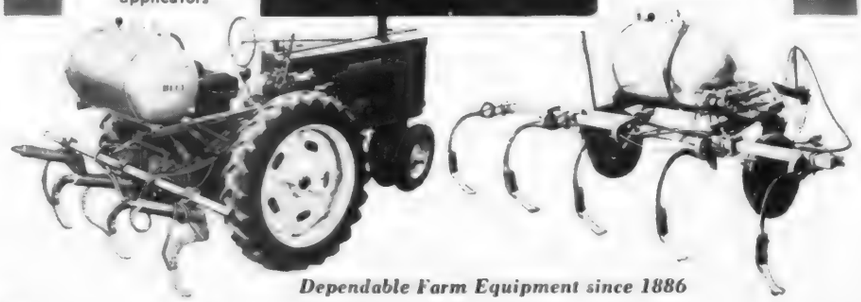
SERIES 10 DELUXE NITRO-SHOOTER with 14' folding tool bar and 5 spring tine applicators



Dependable Farm Equipment since 1886

FARMING TO BEAT THE DROUTH

(*Continued from page* 35)

7,148 acres. Most of the rest of his land will lie fallow, storing up moisture for the next year's crop. Weeds, which would steal from this reservoir, are fought during the fallow year. So important is this moisture conservation, that Garrett will send the sweeps through the wheat fields themselves if the crop is doing poorly—trading a puny crop this year for the chance of a better one next. "Cutting out sections of wheat is a tough thing," he admits, "usually we wait too long hoping that it will make a recovery."

Garrett may curse the weather occasionally, but he doesn't spend much time standing around wringing his hands. In the past year he has sunk three 500 foot wells, each capable of producing 800 gallons a minute through the 16 inch steel casings. So big and deep are the wells that Garrett can shout "Hello" down one and hear four "Hellos" echo back. With this water, he is irrigating fields of grain sorghum on his unused wheat land.

Stretching the Water

Up in Colorado on the eastern slope of the Rocky Mountains and within sight of snow covered Long's Peak, Clarence Svedman farms 1,040 acres in what was probably the worst hit section of the drouth country. From April 4, 1953 to April 4, 1954, a measured five inches of rain fell on his land, which normally gets 16 inches. Irrigation water was drastically curtailed, though the water they *did* get was not dehydrated as some farmers claimed. Winds that reached 70 miles an hour swept across the fields, leaving gravelly bare spots and blowing out the wheat.

"Our wheat yield averaged five and a half bushels to the acre," Svedman said, "and I understand we had one of the highest yields in the county."

Half of Svedman's land is dry, suitable only for wheat and occasionally barley; the rest is irrigated. On his unirrigated land, Svedman has had to resort to even more rigorous farming methods than Garrett uses. "No one actually *likes* strip cropping," he said, "but to fight the blow-

NEW! IOWA SUCTION BLOWER

BIGGER performance at LOWEST COST! Tested and proven *BEST* by most rugged use Iowa farms could give it.

Unloads 3 tons corn silage in 8 to 10 minutes! Also long hay, straw, etc. No-clog pipes. Rubber or steel flexible intake. Long sweeping elbow for *GREATER SUCTION!*

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Also NEW IOWA CHUTE-TYPE BLOWER for side delivery, self unloading boxes or bunk unloaders. Ventura attachment for unloading shelled corn, other small grain. WRITE FOR DETAILS.

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• LOW PRICED...
• VERSATILE...

SHAWNEE REAR BLADES

MODEL 150
- 9 Angle Adjustments
- Tilts and Offsets
- Reversible
- Heavy Moldboard

Ad 509

$120.00 F.O.B. Topeka, Kansas

This model has a 6-ft. wide sliding moldboard, 15 inches high. Fits all 3-point linkage. It offers a great number of adjustments. Replaceable cutting edge. Shipping weight, 300 lbs.

MODEL 100
- 9 Angle Adjustments
- Reversible

$105.00 F.O.B. Topeka, Kansas

This is the lowest priced rear blade, yet gives highest quality service. It has a moldboard length of 6 feet with a height of 15 inches. All-welded construction, with standard replaceable cutting edge. Shipping weight, 205 lbs.

OTHER FINE PRODUCTS OF SHAWNEE ENGINEERING ...Rear Blade Model 200...Shawnee Digger...Bulldozer... Cyclone Auger...Scout Digger...Hydro-Clam.

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There's GOLD in Land Smoothing

This Fall Fill Pot Holes, Smooth Fields with an

Eversman All Purpose Tillage Tool and LAND SMOOTHER

Make plans now to fill pot holes, smooth fields, and improve surface drainage this fall when preparing alfalfa or wheat ground or after crop harvest. Eversman smoothed fields free of pockets, dead furrows and back furrows greatly increase crop yields—reduce labor and water costs on irrigated land. With springtooth attachment the Eversman is a complete TILLAGE TOOL, which breaks clods, mulches the soil, makes a firm, well packed seedbed which holds moisture, makes planting uniform, cultivating easier and harvesting faster.

Six all-purpose models for all standard farm tractors...for AUTOMATIC SOIL SMOOTHING, DIRT MOVING, SEEDBED PREPARATION!

Eliminate Pot Holes

With an Eversman and your own tractor it is easy and inexpensive to eliminate pot holes, fill gullies, straighten out terraces on hillsides, build farm over drainage ditches and grass waterways. Write for useful FREE booklet.

Tried and Proven in Rain Fall and Irrigation Areas Throughout the Nation

EVERSMAN MFG. CO.

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ing we are planting our wheat in strips sixteen rods wide leaving a fallow strip the same width in between."

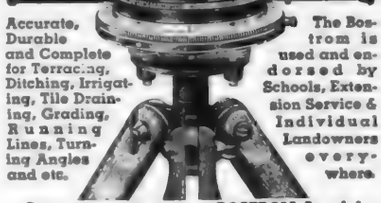
Short, hard driving Svedman, who is called Curly by his friends in the Soil Conservation Districts as a left-handed comment on his thinning hair, was born on the land he now farms a few miles south of Fort Collins, Colorado, and has been an irrigation farmer all of his life. He has believed in and worked for soil and water conservation and has been recognized by other farmers by being elected President of the Colorado Soil Conservation Districts; but even he was appalled at some of the drastic measures suggested for conserving water.

The land leveling equipment, which is owned by the Soil Conservation District and rented out to the members at $12 an hour for each power and leveling unit, consists of Caterpillar tractors; Woolrich Carryalls, for gouging off the high spots and carrying the soil to the hollows; Marvin land planes, 60 foot long frames that carry a huge, hydraulically operated scraper blade; and Eversman ditchers. The Soil Conservation Service furnishes the engineers who survey the land and stake it off for the levelers so that when the hill tops are pushed into the valleys the water will flow smoothly down the furrows. In many cases they are able to so level the land that it can be irrigated from either of two sides. A careful leveling job reduces erosion from furrow irrigation to practically zero.

"I balked at land leveling," Svedman said, "but when it was done I was amazed at how much labor and water were saved. We figure it has cut labor in half and stretched water by a third. A quarter section of our land is farmed by a tenant and he said he could hardly believe how much this one job had saved him in labor. Beside that we don't have any low spots where the crop is drowned out or high places where it withers because we can't reach it with water.

"With the top soil pushed around," he continued, "it usually takes two or three years to get the field back into full production. We speeded that up by putting on as much as twenty tons of manure to

BOSTROM IMPROVED FARM LEVEL



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The Bostrom is used and endorsed by Schools, Extension Service & Individual Landowners everywhere.

Anyone can operate a BOSTROM Level by following the simple direction booklet included with each instrument. We manufacture 3 models; Farm Level, Contractors Level, Convertible Level. All BOSTROM Levels are sold on the guarantee of satisfaction or money back. WRITE TODAY for literature, prices and name of our distributor near you.

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There's No Problem Land When TOWNER'S STUBBLE PLOW is in the Field

Made only by Towner, here's the one plow designed for "unplowable" soil. Brush, sod, stubborn soils plow almost as easily as ordinary soils with this power-packed, three-ton plow. Built to stand the gaff behind large tractors, Towner's Stubble Plow has a low draft line to insure equal penetration of all plow blades . . . leaves the land level and smooth.

TOWNER HIGH SPEED OFFSET PLOW

You gain a full seven days' start with this High Speed Offset Plow engineered for rapid operation in all kinds of weather, all types of soil. The double rows of blades plow and harrow up to 8 inches deep . . . leave the soil level and well mulched.

See these Towner Tillage Tools at your dealer, or send in the coupon below for free, illustrated literature. There's no obligation.

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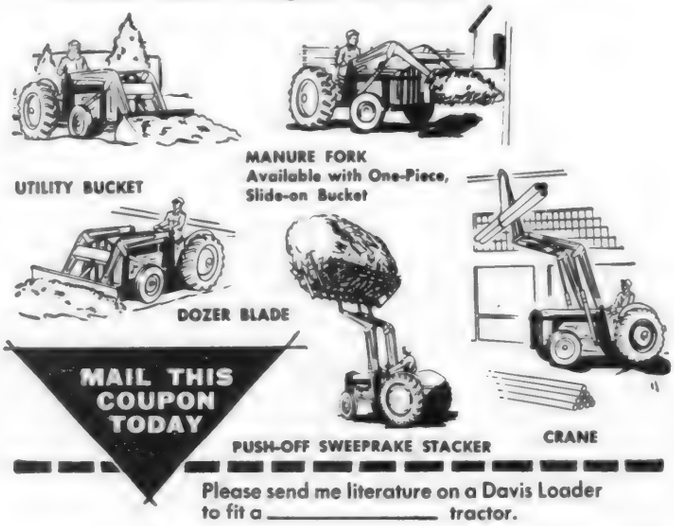

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the acre as well as a healthy application of commercial fertilizer."

Once the land is leveled, Svedman keeps it that way by going over it with a farm-sized Eversman leveler before planting.

Until recently all of the water Svedman and the other farmers in this area used came from the Poudre River, which is a tributary of the Platte. Now, they are beginning to get water from the Big Thompson project which brings water through a seven-mile tunnel from the west slope of the Great Divide and empties it into the Horsetooth Reservoir—a natural trough formed by a hogback ridge and the mountain side.

Using this water at the rate of around two and a half acre feet a year on each acre of irrigated land (an acre foot is enough water to cover one acre to a depth of a foot, or 326,000 gallons) Svedman is raising sugar beets, alfalfa, pinto beans, barley, and corn. "When we have the water we can raise seven or eight tons of alfalfa to the acre and 100 bushel corn. When water is short we may wind up raising tuck corn. What's tuck corn? That's when you can tuck the harvest into your vest pocket."

Sugar beets, which are raised partly for the tops, which are fed to cattle, and the beet pulp which only farmers raising beets can buy back from the refinery, are planted early in March. It is hoped that there will be enough moisture in the soil to germinate the seed and get them started, though some years they must be "irrigated up." In normal years Svedman's beets are irrigated for the first time about the first of June and four or five times after that until October when they are dug, topped, and shipped. Corn is planted the middle of May, irrigated about the first of July and at silking and tasseling. Svedman irrigates alfalfa twice, once before the first cutting and once later in the summer. "The time and amount of irrigation," he said, "depends on the kind of soil you're farming. Twenty miles from here, I know farmers who are working sandier soil that have to irrigate at least twice as often as we do. But no matter what your soil, irrigation is what it takes to grow crops out here, and land leveling stretches the water."

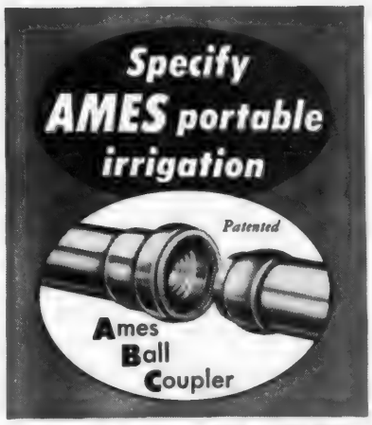
Corn Is Too Thirsty

In north central Kansas where a tantalizing 18 to 25 inches of rain kept the old-timers believing they were part of the corn belt, three neighbors near Woodston, Albert Macy, George Young, and Ivan Grimes, have pooled their knowledge on fighting the drouth and come up with the same answer: the crop must fit the weather. "When I was a kid," Macy recalls, "there were corn cribs all over the farm—and in good years we filled them."

Now farmers in this area have abandoned this uncertain crop and turned to the sorghums for a companion to their wheat. Usually the rotation is wheat; one year of the milo sorghums for grain; and either a fallow year or sorghum for silage. Wheat does not do well following grain sorghum because of lack of moisture, but milo can follow wheat. Sometimes it follows very closely. "Last spring we had a lot of wind," Macy said, "first from the south, blowing dirt against the fences, and then from the north, blowing our neighbor's dirt onto the piled up fence hummock. The last big blow, on April 19, left sixty acres of our wheat with nothing growing but three thistles. We planted the field to Westland milo and made a grain crop."

George Young, Macy's neighbor, who is a director of the Soil Conservation District, said, "There's probably been more research done out here on grain sorghum than on any other plant in the past few years. Why, during the war when there was a shortage of cassava root, they even made tapioca from milo grain. Milo is a crop that will ride with the punch—during wet spells it thrives and when it turns dry it stops growing and just waits for water. We harvest anywhere from twenty-five to fifty bushels of grain to the acre. Last year the price support loan was two dollars and thirty cents a hundred pounds which comes out to about a dollar fifteen a bushel. Another big advantage of milo is that we can use our wheat equipment to plant and harvest it."

Both Macy and Young insist that the neighborhood expert on milo culture is Ivan Grimes, who raises certified milo seed. Grimes laughs at such a compliment and says, "All I know is



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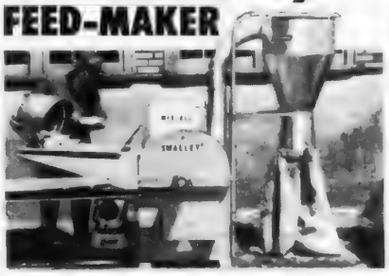

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what my wife tells me. She listens to all the experiment station reports on the radio and when I come in for lunch she tells me how to farm." Grimes goes over his stubble land with a rotary cutter to shred and spread the stalks. He then works the soil with a Graham plow with sweeps attached to the chisels and goes over it yet again with just the chisels. Before planting his Westland milo, he goes over the soil with a tooth harrow. Though Midland milo is a better yielder, Grimes prefers Westland because it doesn't lodge and will hold its grain until snow flies if harvesting is delayed.

Milo seed, treated with cerosan or Agrox, is planted around the middle of June. It is planted three-quarters of an inch deep with a wheat drill. In order to get the thinnest possible planting—these growers have found that three pounds of seed to the acre outyields heavier plantings—every other tube is blocked off and adapters to slow down the seeding are worked into the other tubes.

During the growing season of 105 days, the milo is cultivated as little as possible. Each cultivation, it has been found, turns up moist earth to evaporation and loses the equivalent of an inch rainfall. One year Grimes got away without any cultivating; usually he has to cultivate once.

Harvesting in October or November is done with the regular wheat combine. "All you have to do is to slow down the cylinder to keep from cracking the grain and to open up the concave. With these adjustments, the combine will sail right through a field of milo," Grimes said.

Increasing Corn Yields During Drouth

Corn growers in Missouri have been following the experiments on soil fertility conducted by the University of Missouri with close attention. This work, done largely by G. E. Smith and D. D. Smith (no kin) on the farms and in the experimental plots has shown that deep, heavy fertilization helps the corn plant push its roots four to six feet into the ground to drink up all the moisture in the soil. They also have shown that the available moisture is used more economically—a well fertilized field of corn produced 79 bushels to the acre using 5,600 gallons of water for each bushel produced; a poorly fertilized field yielded only 18 bushels to the acre and consumed 21,000 gallons for each bushel.

These findings were not lost on Silas McCubbin, who farms 700 acres near Sturgeon, Missouri, with his father-in-law, Odie Riley. "We started heavy fertilization in 1952," McCubbin said. "That year we poured on a miserable lot of fertilizer—800 pounds of 10-8-6 to the acre as plow down and 200 pounds of 12-12-12 as starter. That year, which was dry but not too bad of a corn year, we harvested 124 bushel to the acre and won the Sturgeon Chamber of Commerce corn raising trophy. The next year, which was a real dry

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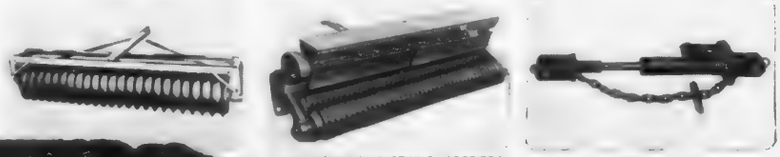

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one, we plowed down 200 pounds of 0-45-0, 200 pounds of 0-0-60, and 100 pounds of nitrogen in the form of anhydrous ammonia along with starter fertilizer. We raised our yield to 127 bushels to the acre, but we came in second to John and Clyde Finlay in the corn contest. They were using lots of fertilizer too."

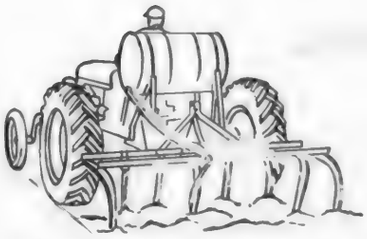
In 1954 McCubbin used the same fertilizer he had the year before—and ran into a surprise. "The corn made such a good start that the College brought out two different classes to look at it," McCubbin recalls. "At tasseling time it was two weeks ahead of corn grown on low fertility ground. Then the weather hit us. Right at tasseling time we got a heat spell when the temperature went up to 113 degrees and it was hot day and night with a hot wind blowing. The corn burned and the ears didn't seem to be properly pollinated so I cut most of it for silage. The part of the crop we left standing made 20 bushel, which is about what unfertilized corn did last year. It wasn't the fertilizer did it; it was being right at tasseling when the hot winds hit us."

Proof of McCubbin's theory that it was the hot wind rather than the fertilizer that done him in, is given by his chief rivals in the corn growing contest, John and his son, Clyde Finlay, whose 380 acre farm is 15 miles away on the other side of Sturgeon. The Finlays, like McCubbin, poured the fertilizer to the land, but their corn field was protected from the wind on three sides by bluffs and trees. When harvest time came in this terrible corn year they husked out 102 bushels to the acre.

"We made over a hundred bushels, but we didn't win the corn contest," John Finlay said. "Since everyone who was hit by the winds lost their crop—and we were about the only ones who weren't hit by it— they decided to call off the contest. I told them I thought I would want to call it off too—if I were them."

No Retreat

This time, unlike the drouth of the thirty's, there is no Grapes of Wrath exodus from the dust bowl. Farmers are staying and fighting it out with the weapons which have been developed or which have come to be accepted in recent years. Where there is enough moisture, soil is being tied down and improved with legumes; stubble and clods fight the wind in the dryer areas; land leveling is stretching the water supply; new crops are planted where old ones failed because they were not adapted; plow-down fertilizer is coaxing the roots down to moister soils. One or more of these practices are being used on the successful drouth-stricken farms and the farmers have determined to keep at them during good years. They have found that they pay.



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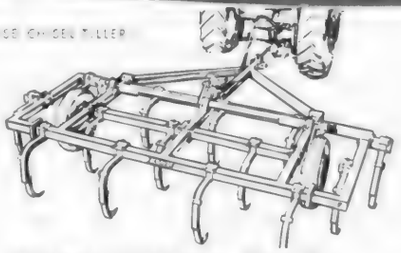

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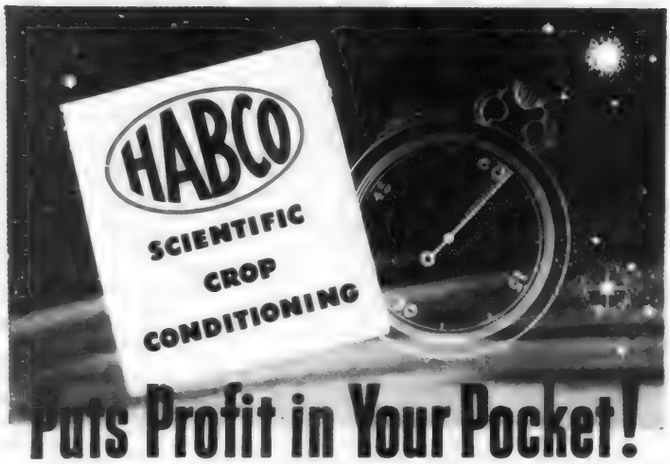

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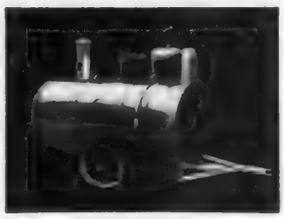

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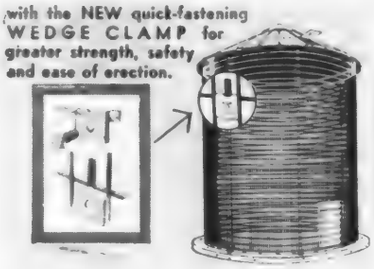

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BIGGEST BOOB IN THE BARNYARD

(*Continued from page* 65)

A wild turkey, meeting one of these creatures, would be justified in letting a proud sneer lift the corner of his well-curved beak, for the modern domestic turkey is the moron of the barnyard. In comparison, a goose is an intellectual giant and a hen is a keen thinker. The turkey is so stupid he has to be taught what food is, while his sense of moral values is so deficient that it is often necessary to put a muzzle on his beak to prevent cannibalism. And as if that isn't enough he is also susceptible to approximately 17 diseases.

These shortcomings make the turkey hard to raise. As the foreman of one of Canada's largest turkey farms has remarked, "A lot of farmers think raising turkeys is a short cut to the lunatic asylum." Nevertheless, many people do raise them and production is rising steadily since turkey has become everyday meat instead of a Thanksgiving and Christmas luxury.

Turkey-raising practices vary. Some large-scale operators cover the entire cycle—incubating eggs, raising poults, feeding for market. Others buy day-old poults (technically, a poult is a turkey of such tender years that its sex is not discernible) and go on from there. Still other raisers buy "started poults"—poults from 10 days to several weeks old—and feed them into table-sized gobblers.

Whatever the plan, there are problems. Without artificial incubation, production would be slow. Left to itself, the hen turkey could, no doubt, lay a clutch of eggs and brood them until they hatch. The broody urge in the hen turkey, incidentally, is shown by persistent nesting, hissing and walking on tiptoe. While the hen is thus engaged in motherhood she quits laying, thus reducing the farmer's output. Further, as soon as the poult climbs out of the shell, it can pick up such items as lice, typhoid, coccidiosis, fowl pox or blackhead from the proud, but not necessarily healthy, mother.

For increased turkey production, the industry has turned to artificial incubation and brooding. This brings its own troubles such as disease spread through overcrowding, poor growth, or rickets, but these can be avoided by providing proper temperature, a balanced diet and good ventilation.

There are several types of incubators, but the general idea is to maintain a constant tempertaure (about 99 degrees Fahrenheit), a fairly high humidity, and good ventilation. The ventilation is necessary, because the growing embryo exhales carbon dioxide through the shell and would smother to death with the incubator closed up. The importance of fresh air was shown in experiments with hatcheries on the high, dry plateau of Colorado, Utah, and Wyoming, where thousands of turkeys roam the range like cattle. The altitude is about a mile high and hatcheries were experiencing a 50 per cent mortality rate until fresh oxygen was pumped into the ventilating system, whereupon the hatching figure went up 18 per cent.

While the incubating is proceeding to its 29th day climax, the eggs are turned frequently. This is supposed to allow the growing embryo to orient itself inside the shell, and the egg is supposed to be turned every three hours, night and day.

After the embryo has "pipped" the shell, it is called a poult and has to be brooded—supplied with warmth either from a mother turkey, a foster mother hen, or artificially in brooder houses. If it is the latter, they are kept warm either by heat lamps or by brooder stoves. The stoves are often fueled with oil, which is preferred to electricity by many farmers owing to the disastrous consequences of power failure. Also, oil-burning brooder stoves, while more dangerous, are usually more economical and costs are a vital factor in turkey raising—five per cent is considered a good return and, if the Christmas market goes the wrong way, the farmer may end up with a net loss. This is one reason turkeys are raised on ranges if possible—they're fond of grasshoppers and other insects and grass.

If the farmer is aiming at the Christmas market he will start his poults around the latter part of May or early June, since it takes about 28 weeks of steady nibbling to pack edible white and dark meat on the bigger birds. The poults are separated from

adult turkeys, usually in mobs of 200. The brooder house floor is of slats, or wire mesh, to keep the birds off the ground, since if there is any disease germ lurking in the soil, the turkey will catch it. This sanitary floor has its own drawback—if a poult sticks his leg through between the slats and becomes trapped, the other poults in the neighborhood may leap on him with joyful gobbles and peck him to death. Why this is so, no one knows—a turkey won't talk.

In this artificial environment—or because the bird is hopelessly stupid—the poult has to be taught to eat and drink. Some growers put small pieces of hard-boiled eggs into the prepared turkey "mash," others put marbles—especially green marbles—into both the mash and the drinking water. The idea was that the poult would peck at the marble and stumble on the food. Turkey-starter mash is finely-ground, not too appetizing, so one current practice is to spread a mixture of cracked corn, wheat and oats on top. Eventually the poult gets the idea.

Mortality rates vary widely—depending on the skill and luck of the grower—but on the average, up to 15 per cent of the poults will pass away before they reach 12 weeks. Besides never learning to eat, poults have died from: smothering, choking to death on straws or sticks, getting stepped on, being struck by lightning, drowning, catching such ailments as pullorum, typhoid, ulcers of the gizzard, coccidosis, sinus—a disease which produces yellow spots on the liver and is usually fatal. They have also fallen prey to coyotes, dogs, cats, rats, skunks, hawks, owls, or their own cannibal cousins. And they are often frightened to death.

Young turkeys slip easily into cannibalism owing to their habit of picking at each other's feathers. If this happens to draw blood, the other birds—moved by some dark, psychotic impulse—fall on the victim and finish the job. One way to prevent this mob massacre is by muzzling the turkey with a small wire device known as a turkey bit, which prevents him from fully closing his beak on a buddy's feather, but still lets him eat.

Put Out on Range

As soon as the poult reaches the stage where artificial heat is not necessary (about six weeks), he (or she) is put out on the range, but it must be fresh land

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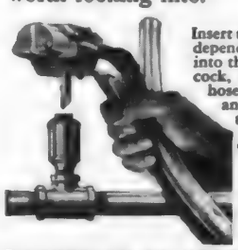

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FORAGEMASTER AUTOMATIC FEEDING

FORAGEMASTER Rotobunk Powered Bunk that goes around the silo like a merry-go-round makes the simplest type of automatic feeding. When used with FORAGEMASTER Silo Unloader you get the closest thing to push-button feeding available.

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Newest WADE RAIN Mechanized Moving Method

Fastest, easiest lateral moving method known. Cuts crop production costs, saves labor. Tractor moves up to ¼ mile of lateral as a unit, without going through crops. There's a Wade Rain system that's right for every size farm, every type of crop, including wheel-mounted, engine-driven POWER-ROLL, and famous WADE RAIN, with exclusive Self-Draining Loks-In Gasket.

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Please send me my FREE Copy of "Farm-Facts" and the Name of Nearest Wade Rain Dealer.

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Since 1865 Makers and Distributors of Farm Equipment of the Highest Quality

soil conservation costs hit a new low!

THIS TUMACO EQUIPMENT BUILDS TERRACES FOR ABOUT 1¼¢ A FOOT...

does virtually any soil moving job.

levels, fills gulleys, digs ponds, builds waterways, diversions and drainage ditches,

Yes, Tumaco builds terraces for 1¼¢ a foot—and this includes operator's time, fuel oil, grease, interest on investment, depreciation and cost of repairs and maintenance.

Compare this 1¼¢ with 3¢ to 6¢ a foot—the national average cost for terracing and it's easy to see Tumaco pays its own way, wherever there is conservation work to do.

Even if your terracing needs are small, you can join with your neighbors in making this equipment investment—or do contract work for the farms in your area. It's a money making proposition any way you figure, because Tumaco offers complete soil moving services at an outstanding low cost.

Before you buy any soil moving equipment, or BEFORE YOU CONTRACT for the work, get the complete information about the new Tumaco.

INCLUDES TERRACER, SCOOP and ANGLE DOZER
•
FAST, TIME-SAVING Handles the dirt only once.
•
EASILY ATTACHED or REMOVED from tractor at any time.

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• **WRITE TODAY** for complete information about TUMACO EQUIPMENT and name of nearest dealer.

910 EAST MAIN • MARION, KANSAS

each year. This has led to growing turkeys to maturity in confinement, in permanent quarters removed from the brooding houses. Careful sanitation keeps mortality to a minimum. Each bird is allowed about seven square feet of floor space, ample for entertaining. As the bird matures, it loses its taste for mash and acquires a liking for grains such as whole yellow corn. On this diet it puts on white meat and fat and becomes more edible daily.

Timid—yet given to gobbling furiously at strangers—friendly and curious, but maddened at the sight of blood, the domestic turkey is as mixed up as his ancestry. But occasionally the old instincts seem to appear. During the famous 1938 New England hurricane, for example, turkeys left their coops and formed a "V" on the ground, crouching low and facing into the fierce wind that toppled barns.

Again, in 1945 a snowstorm of historical proportions swept Ontario, and a Binbrook farmer missed one of his Christmas turkeys. Thirty-two days later, on January 13, the farmer's dog sniffed and then scraped at a snow drift. From under 30 inches of snow crawled the missing turkey—weak, thin, but still alive and gobbling faintly. The turkey didn't get a medal—he got fattened up for Easter.

THE AUTHOR: John Largo, a Canadian, is a man of varied talents. He earns his bread and butter as an oil company worker, but he also designs boats, some of which will float when placed on water, and invents inventions, none of which are yet in production. In his spare time he writes, and has the customary land-hunger that afflicts writers. He plans to own a tree farm, because, as he says, you don't have to feed trees.

HIRE AN ELECTRIC FARMHAND

(*Continued from page 47*)

of milk in his cooler for each hour's work. The smaller dairyman works harder and longer and yet pumps fewer pounds of milk per hour's work into his cooler. Some economists feel that an up-turn in dairy prices may come, not from city dairies selling more milk to more people, but from a diminishing supply of on-the-farm producers.

A run down on the cost of any piece of barn equipment, such as a silo unloader, suggests who can afford it and why.

Initial silo unloader investment (including installation and wiring)	$1600.00
Annual cost:—	
Depreciation (@ 5%)	$80.00
Repairs	32.00
Insurance, interest, taxes	48.00
Total annual cost	$160.00

This unloader was operated 240 days a year. Dividing $160 by 240 gave a daily cost of 67 cents, to which must be added another 5 cents for electricity, making a total of 72 cents. More frequent use would reduce this cost.

At the same farm, costs are kept on electric barn cleaners. The stanchion barn has a central alley with the cows facing outward, a gutter behind each line of cows. The cleaners in each gutter and a cross conveyor move manure out through the barnyard to a stacker. In winter the manure is stacked. Whenever equipment can be driven on the fields, that manure is dumped directly into a spreader.

Here is the way the cost figures run on this item:

Original investment (including installation and wiring)	$1850.00
Annual cost:—	
Depreciation (@ 5%)	$92.00
Repairs	18.00
Interest, insurance, taxes	55.50
Total annual cost	$165.50

NORTHERN
BOB-WHITE
QUAIL
None Better

Sept. 1st to Dec. 31st Delivery..$3.00 per pair
Jan. & Feb. Delivery..... 4.00 per pair } Mature Birds
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Young Birds (8 to 10 weeks old, 2/3 grown), ideal for restocking, for sale July to Nov....20 birds for $22.50

CHUKAR PARTRIDGE—20 Birds, 6 weeks old.....$25.00
Mature Birds .....$6.00 per pair

Minimum order: 10 Birds

All prices F.O.B. Joplin, Mo.
1/3 deposit required on orders, balance C.O.D.

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Oven-dressed and frozen quail, shipped with dry ice, prepaid anywhere in U.S. at $28.00 per doz.

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clean *PENTA-treated* poles
keep sturdy buildings up for years longer
—resist rot and termites

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Building time and costs are cut so sharply because the pole plan eliminates much fancy sawing, fitting and mortising—also simplifies foundations. And *PENTAchlorophenol poles protect against damage from decay and termites; structures stay sound and serviceable years longer with minimum upkeep.

Your local lumber dealer is your best source of supply for quality-controlled PENTA-treated posts and poles. We suggest you see him soon. And meantime, let us provide you with helpful information about how and where PENTA-treated poles, posts and other wood can save you expense. THE DOW CHEMICAL COMPANY, Midland, Michigan.

Corn cribs and other structures are built cheaply, last longer on PENTA-*treated poles.*

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☐ Tell me where to buy clean PENTA-pressure-treated fence posts.

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WHY SWEAT AND DIG for 5*¢ WHEN THE NEW 1956 McLEAN SILO UNLOADER WILL DO THE WORK FOR YOU

*Average Cost for Electricity Per Feeding with a McLean Silo Unloader

Just push a button and let a McLean Silo Unloader automatically feed your cattle fluffy and thoroughly mixed fresh silage. The new 1956 McLean Silo Unloader is years ahead of other automatic unloaders and gives you more for the money. Many operators are now feeding hundreds of head in a matter of minutes. It even handles frozen and grass silage. Requires no suspension...is electrically powered... eats around and down silo. Sizes to fit any tower silo. Easy to adapt from one size to another. Installation is simple because it is assembled in sections like a trick bicycle.

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Manufactured by Silage Equipment, Inc., Wichita, Kansas, for Dodson Manufacturing Co., Inc., and other distributors of silage equipment in U. S.

LARGE OPERATORS IN THE SOUTHWEST USE THE FAMOUS DODSON "RED & WHITE TOP" SILO FOR THE MOST ECONOMICAL SILAGE STORAGE!

See why farmers and stockmen of all kinds...from ranchers who feed hundreds of head to dairymen with small herds... find a Dodson "Red & White Top" silo more economical than any horizontal type. It lasts longer because it's built stronger. Known for quality for more than 46 years. Made of famous heavy-duty Air-Cell staves...available in capacities from 1000 tons on down. Sold in Kansas, Oklahoma, Texas, and Southwest Missouri.

Please send me literature on the . . .
McLean Silo Unloader_____Dodson "Red & White Top" Silo_____
NOTE: *Inquiries received from outside Dodson sales area will be referred to Silage Equipment and nearest distributor in your area.*

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ADDRESS_____

TOWN_____STATE_____

DODSON MANUFACTURING CO., INC.
1463 BARWISE WICHITA, KANSAS

The cleaners are used an average of 275 days a year, making their daily cost 60 cents. Electricity costs another 3 cents, for a total of 63 cents a day. Time saved is estimated at 25 mnutes a day. Who can spend 63 cents a day to save 25 minutes? Obviously, not a dairyman who is earning less than a dollar an hour. Yet, if the future of dairying can be learned from the past, the men most likely to succeed are those who can handle more cows per man and thus put more milk in the cooler per hour worked.

Cow trainers for the 24 cows cost $62 installed. Their annual cost is:

Depreciation (@ 4%), $2.48: repairs, .31: interest, insurance, taxes, $1.86—a total annual cost of $4.65.

It is estimated that the trainers are used 240 days a year. Thus their daily charge is about 2 cents. The electricity supplied by a regular electric fence charger costs another penny, bringing the daily cost to 3 cents. The trainers are credited with saving the men in the barn an estimated 15 minutes a day in scraping manure and grooming the cows.

At this same farm, the feed plant includes a grinder, metering augers, conveyor, and a wagon equipped with an unloading auger. Three hundred pounds of ground feed are fed daily. The conveyors move the grains from storage bins to the grinder, which has a capacity of two tons of corn an hour. The ground grains go into separate metal hoppers alongside other hoppers of purchased concentrates and bran. The amount of each ingredient going into the feed mixture is carefully measured by metering devices.

The mixed feed is augered into a ton-and-a-half feed wagon and the wagon is pulled to the bank barn and put in place above the stanchion area. To deliver feed to the cows, a flip of a switch downstairs starts the unloading auger on the wagon and the feed falls into a waiting cart through a chute in the ceiling.

Costs on the complete set-up are as follows:

Initial investment: Hoppers, metering equipment and motors, $2200.00; grinder and 7½ H.P. motor, $1100.00; conveyor, $400.00; feed wagon, $600.00; wiring, $200.00—a total of $4,500.00.

Annual cost: Depreciation (@ 4%) $180.00; repairs, $22.50; interest, insurance, taxes, $135.00—a total annual cost $337.50.

The life expectancy of this equipment has been written off at 20 to 25 years. Both common sense and the manufacturers will tell you that it will not last that long—a feed mill, for example, will do well to be running after 10 years. A great deal depends on the care given the equipment and how good a repair man you are. However, the University of Wisconsin people had to pull some figure out of a hat, and 4 and 5 per cent came out. These depreciation figures should be used as something to aim at rather than expect.

Estimate Your Own Savings

Just because these items pay out on one farm doesn't mean they will be a wise investment on all farms. For example, Lynn Brooks, manager of the Wisconsin farm just discussed, feels that a home feed mill of the type described above will not pay out with a herd of fewer than 40 cows or on a farm which uses less than a ton of feed a week. He looks at it this way: A dairy cow is fed an average of about 7 pounds of ground feed a day, about 50

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48 Ft. $389.50

Prices with carriage & winch
at DODGE CITY, KANS. or MONMOUTH, ILL

"I'd give up silage—rather than go back to pitching by hand"

says Walter Petersen, Britt, Iowa.

"I've only had my silo unloader two months, but it is certainly the last piece of equipment I'd part with", relates Walter Petersen.

Mr. Petersen and his son Jim feed 25 head of dairy cattle & young stock. Both are very enthusiastic about their new silo unloader.

"I never realized feeding silage could be so simple. All I do is throw the switch . . . down comes the silage . . . faster than I can carry it away. I never turn on the unloader until I'm ready to feed. 10 minutes time, the entire feeding job is over", says Jimmy.

Mr. Petersen was quick to add, "of all the jobs on the farm that ought to be done mechanically, there's none that rate any higher than throwing down silage. A man is just asking for trouble to climb up a cold ice covered silo chute twice a day, work up a good sweat throwing down silage, and then have to go back out into the cold again with damp clothing on."

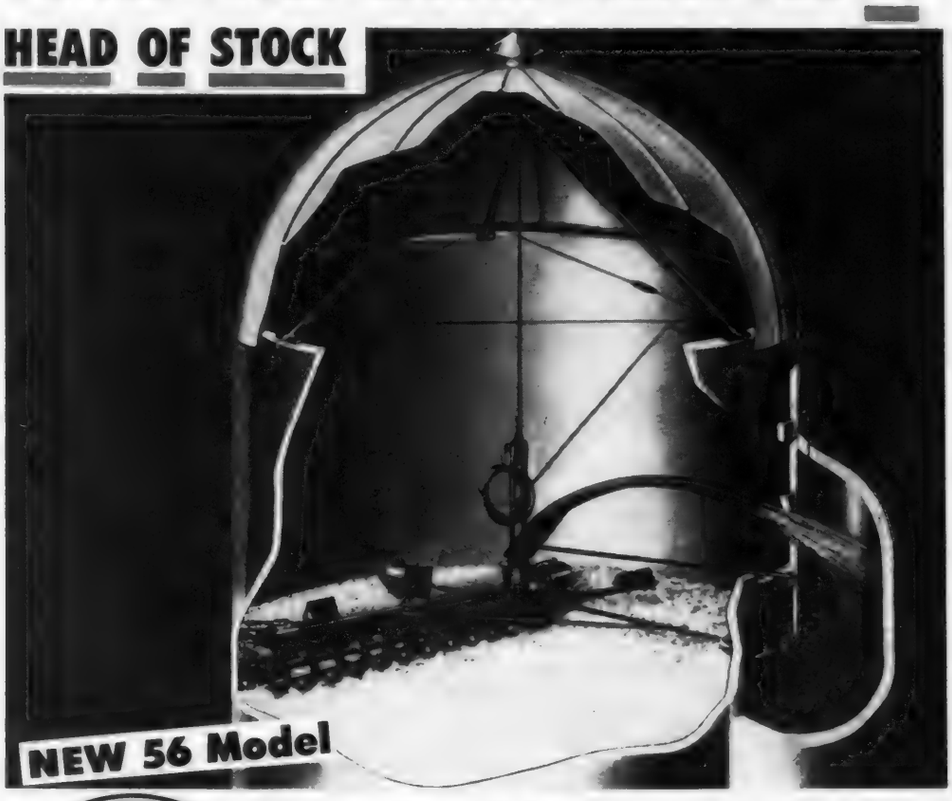
Mr. Petersen's observation is very pertinent. Climbing up and down the silo is a tremendous, and often hazardous task. Although that silo may be only 48 feet high, a winter's feeding means climbing practically 4 miles over an awkard cold, ice covered ladder. If the silo is higher, or has no chute, this job is even more treacherous.

One of the most severe jobs the silo unloader has to do is that of removing frozen silage. "We've had several days of subzero weather this winter and I see absolutely no reason for concern over frozen silage with our unloader. Frozen silage used to be a real problem, not only to break loose in the silo, but also to get it broken up so the cows could eat it. The unloader does both jobs better than I ever did by hand."

"It's amazing" states Mr. Petersen, "the kind of results you get with new equipment. Last winter, when we were throwing down silage by hand, both Jimmy and his older brother were at home to help with the chores. They're both real good boys but when it came time to feed silage, we used to have some real arguments as to who was going to climb the silo."

"That's not the best part of it", Jimmy added. "Since the silo unloader cut chore time in half, I've been able to sleep that extra half hour I've always wished I could do."

2¢ A DAY TO AUTOMATICALLY POWER PITCH ENOUGH SILAGE FOR 50 HEAD OF STOCK



CLAY SILO UNLOADER

STOP DANGEROUS, DAILY CLIMBS UP AND DOWN SLIPPERY SILO CHUTE. Decrease lifting and carrying drudgery. Modernize. Speed up entire feeding program. Push a switch inside your barn . . . power pitch your silage right into a cart . . . in minutes . . . for less than the cost of a glass of milk.

Eliminate forever forking silage in a freezing, windy silo with icy silage flying down your neck, getting into your eyes.

HAVE PALATABLE SILAGE . . . THE YEAR ROUND. Silage comes down ready to eat. It's fluffy . . . no big chunks that cows refuse to eat or push into their bedding. Less waste. No chopping or carrying.

CUT HIRED MAN WORRIES. No hired man can throw down silage as cheaply as a Clay unloader. Farm labor is hard to get, harder to hold. Eliminate that worry. Make chores easier. Hold your own boys on the farm.

KEEP SILO FROM STANDING EMPTY. Silos represent a huge investment. Idle silos represent a complete loss of that investment. Save silo investment. Let it make you money. Fill your silo, empty it by flicking a switch. Plan ahead now to make your farm more productive, more profitable, more labor-saving, more enjoyable. Clay's new Silo Unloader book gives complete facts on streamlining dairy chores. Ask for your free copy.

NEW FREE SILO UNLOADER CATALOG

Learn how to make your farm more labor free. Cut chore hours to a minimum.

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CLAY EQUIPMENT CORPORATION
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CLAY

Gentlemen: Please send me new catalog on

☐ Silo Unloader ☐ Walk-Thru Stalls
☐ Barn Cleaner ☐ Crop Drier

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Jamesway

POWER CHORING

Feeds his Cattle

This powerful Jamesway Power Choring Combination—silo unloader and cattle feeder—feeds twice the cattle in half the time required by hand feeding. And you do it all with the push of a button.

It solves hired help problems . . . boosts feeder income. Easy to install this fall and use feeder with silo all winter.

Check these practical advantages:

CUTS COSTS—Saves time and work. Automatically does work of 2 men, a tractor and feed wagon in half the time.

SAFER—Eliminates hazardous, heart-straining job of throwing down silage by hand.

FLEXIBLE—Fits any feeding operation; feeds two different rations at same time if desired.

CUTS WASTE—Unloader mixes, aerates, breaks chunks. Improves palatability; cuts feed waste. Cattle clean up feed bunks . . . fast! Gain more, too—up to ¼ lb. more per day in dry lot than cattle on pasture.

MAKES WORK EASIER—Push-button Power Choring makes cattle feeding boy's work. Completely eliminates need for handling feed . . . frees you for other work in the field or around the barn.

See your Jamesway dealer today for details on labor-saving Jamesway Power Choring and barn equipment. And ask about handy Jamesway time payment plans.

New Silo Unloader 53% Greater Capacity

New, 1956 model Jamesway silo unloader is 53% more efficient: takes less power. Twin-Turbo agitators turn 40% faster. Combination sets of disc and blade attachments level-cut silage . . . handle grass, and corn, silage **any time**; frozen or unfrozen.

Jamesway

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FIRST IN POWER CHORING
(T. M. Pend.)

Mail this coupon for free literature on Power Choring equipment.

Address: THE JAMES MFG. CO., Dept. FQ-955, c/o your nearest branch office.

☐ Cattle Feeder ☐ New Silo Unloader
☐ Barn Cleaner

Name ..... Route .....

Town ..... State .....

pounds a week. Fifty pounds a week times 40 cows is a ton of feed. To have this custom ground at 15 cents a hundred would be $3 a week for grinding and mixing.

It would probably take at least 4 hours a week to load homegrown grains, haul them to the local mill for grinding, return and unload the ground feed. At $1 an hour this is another $4 saved. In all, a total of $7 a week would be saved along with a lot of back-breaking work.

A home feed mill with a 2 ton capacity can grind and mix feed for about 20 cents a ton. Comparing this with the estimated $7 for custom grinding leaves a savings of $6.80 a ton to pay for the mill. This would be a yearly saving of $353.60, better than a 7½ percent return on a $4500 investment.

Brooks also recommends the following formulas for determining whether a barn cleaner and a silo unloader will pay for themselves:

For the barn cleaner:
Initial cost x .09 (annual cost figures out to about 9% of initial cost as shown in the breakdown on page 99. Original investment $1850.00; annual cost $165.50) equals cost per year.
Number of cows in stalls x 3.5 (hours per year saved per cow) equals number of hours saved per year.
Hours saved per year x wage rate equals dollars saved per year in wages.

For the silo unloader:
Initial cost x .10 equals cost per year.
Number of cows fed silage x 2 equals number of hours saved per year.
Hours saved per year x wage rate equals dollars saved per year in wages.

If the amount saved per year in wages is greater than the cost per year, the machine is probably a good buy. This, however, is not necessarily the controlling factor. Installation of labor saving equipment may provide the key to greater profits by permitting an expansion of the operations. Statistics from the leading dairy states indicate that while the number of dairy farms is steadily declining the

2-Way LIGHTNING PROTECTION

FOR FARM BUILDINGS

Lightning never has destroyed any building fully protected by Security System. It guards against new perils of metal ducts, piping, etc. Uses most durable materials, all UL approved. Low points, neat, almost invisible.

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Green Guard Protective Capacitor is the only such device approved by Underwriters Laboratories, Inc. Holds lightning surges to *less* than line voltage, protects heaters, lamps, motors, etc. Guaranteed for five years. Send for full story. Security Mfg. & Contracting Co., Burlington 5, Wis.

SECURITY LIGHTNING PROTECTION IN THE MODERN MANNER

size of herds is increasing and the economic advantage seems to lie with herds of 20 cows and larger. Again, installation of the equipment may mean more time for the operator to devote to other jobs which will help plug up some of the leaks where profits are slipping away.

New owners of power choring equipment will probably find themselves in the same entranced state as the farmer who was asked by a time study specialist what he did with the time he saved after putting in a silo unloader and a barn cleaner. The farmer might have gotten away with a logical answer but for the presence of his wife who spoke first. "I'll tell you what he does," she said, "he's so pushbutton happy he just stands there and watches the darn things work."

(Note: Many of the manufacturers of barn equipment belong to and their names and addresses may be secured from the Barn Cleaner, Cattle Feeder, Silo Unloader Association, 330 S. Wells St., Room 1500, Chicago 6, Ill.)

THE AUTHOR: Robert Battin is a senior at the University of Wisconsin, majoring in agricultural journalism and economics. Most of his early life was spent in Kansas, but he came to Wisconsin after military service. He is an associate editor of the agricultural college student publication, and works part time for the University's Electric Research Farm where he obtained much of the information reported in this article.

Cut Feeding costs up to 40%

If you feed Hogs, Cattle, Sheep or Poultry you need a BELL "Modern" Hammer-Mill to get the most profit out of farming.

GRIND YOUR OWN GRAIN & ROUGHAGES

Cut feeding costs and increase the weight of stock animals by feeding home-grown, GROUND shelled or ear corn, with or without shucks, oats, wheat, alfalfa, clover and soy bean hay. A BELL "Modern" Hammer-Mill will do it for as little as ¾ of a cent per hundred pounds. 1000 pounds of properly ground feed often produce as much Milk or Meat as 1250 lbs. of unground feed, thus the highest possible Feeding Value for growing pigs, and other stock animals is obtained at the lowest cost per pound of increased weight.

SAVE MONEY ON GRINDING COSTS!

BELL HAMMER-MILLS are made for ELECTRIC or ENGINE POWER, in 2 Universal, Low Cost Sizes. Capacities up to a ton of shelled corn thru a ¼" screen, or 1400 lbs. of ear corn thru a ⅜" screen, per hour. Write today for full information.

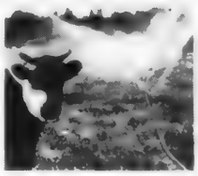
BELL'S NEW MODERN HAMMER-MILLS

Send for Special Illustrated Folder and Prices today.

THE C. S. BELL CO. Mfrs.
Dept. F. HILLSBORO, OHIO.
CORN SHELLERS HAMMER-MILLS FEED MIXERS

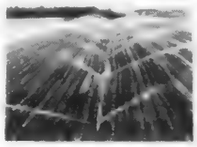
What Sprinkler Irrigation does for others *it can do for YOU!*

DAIRY FARMING



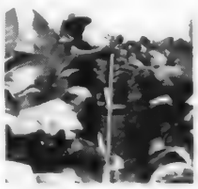
"Sprinkler irrigation has cut summer feeding costs and I am getting more milk in the dry pasture season," says Vern Kohlstrand, Warren, Oregon. "My 20 acre portable sprinkler irrigation system easily paid for itself in three years."

VEGETABLE GROWING



Frank Reed of Alma, Arkansas, says, "Although 1954 was so dry we had to water the land before plowing, our 160 acres of sprinkler-irrigated truck crops averaged out about 200% ahead of other years! We had a fine harvest, right when prices were highest!"

TOBACCO FARMING

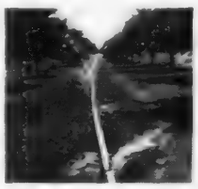


Tobacco farmers like E. W. Cocke of Gretna, Va., find sprinkler irrigation increases quality as well as quantity. "Four acres of non-irrigated tobacco made 1522 pounds per acre at 44½ cents a pound," reported Mr. Cocke. "But 4½ acres of sprinkler irrigated tobacco made 2432 pounds per acre at 69 cents a pound, for an overall *increase* of $1001 per acre!"

COTTON FARMING

"Sprinkler irrigation of cotton added 175 pounds of lint per acre," reports Delmer Holloway, Monroe County, Mississippi. "In 1953, without irrigation, I made only 153 bales on 160 acres. In 1954, although I started irrigating too late to get best results, my sprinkler irrigation system increased my yield per acre by 175 pounds of lint."

FRUIT GROWING



Irvin Graves, owner of Mountain Valley Orchards near Clarksville, Arkansas, reports—"We find that irrigated fruit has much better size, color, and flavor than those which were not irrigated. We like aluminum pipe because of the ease of handling and its resistance to corrosion."

FARM INTENSIVELY, MORE PROFITABLY—with PORTABLE SPRINKLER IRRIGATION

No matter *where* you farm or *what* you farm, a portable sprinkler irrigation system will give your crops the same kind of outstanding quality. PLAN YOUR SYSTEM NOW . . . Contact your local dealer who handles strong, lightweight, rustproof Reynolds Aluminum Irrigation Pipe. He'll gladly plan and give you an estimate on a portable sprinkler irrigation system engineered to your particular requirements.

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New Movie and Booklet on Portable Sprinkler Irrigation—

See "Portable Sprinkler Irrigation Roundup," movie on results from sprinkler irrigation in all parts of the country. Available without charge through your farm leader.

SEND TODAY for free booklet, "More Income Per Acre," with details on applications and advantages of portable sprinkler irrigation. Write to *Reynolds Metals Company, P.O. Box 1800-SJ, Louisville 1, Kentucky.*

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STRETCHING THE YEAR

(*Continued from page* 48)

ture in its soil testing and reporting program, has come up with a better idea. It's called the "Pacemaker Prescription Plan." With this program, the farmer sending in soil samples states the number of bushels that he plans to grow. Veteran Soil Technician Dr. H. H. Hull, makes the analysis and tells the farmer how much plant food he will have to apply if he wants to reach his goal of 100, 125 or 150 bushels. This makes good sense. Along with this plan, the farmer is told that nitrogen is from 60 to 80 per cent efficient and that phosphorus is only about 30 per cent efficient. Based on these efficiency figures farmers are told that the corn crop can get only about 40 per cent of the N, P and K out of the soil. Farmers are also told that fertilizer does not mix and spread through the soil like ink in water and that it must be applied so the plant roots can reach it.

With the facts the farmer receives when the recommendations come back from the soil technician, he is able to lay out his route to the 100-bushel goal. He will know how much plant food he will need for the crop; he will know how much of this his crops can get from the field: he is in a better position to know how much fertilizer he will have to apply each time he goes over the field. For instance, if he finds he is going to need 160 lbs. of nitrogen, 60 lbs. of phosphorus and 125 lbs. of potash for his 100-bushel corn he will be able to figure out that he will not get it all from the starter fertilizer at the time of planting, but he will be more likely to get it from starter plus fall plow-down.

So when the farmer knows how much fertilizer or plant food that it takes and when he knows what his present plant food soil inventory is, as far as N, P and K are concerned, he is in a better position to know how much to apply and when and why and why not. He is apt to take the quickest approach to fertility and one that has been found good and practical—fall soil building.

Fall application appeals to a farmer because it comes at a time when he has labor available. After the corn harvest in the fall, there is usually time to shred the stalks, apply the N, P and K in a one-shot application with a high analysis formula like 12-12-12, with fewer bags to lift. Or he may spray on liquid nitrogen solution or spread urea (45 per cent N) to disintegrate his corn stalks when they are turned under.

Usually a farmer can save money by buying and spreading his fertilizers in the fall. Several systems of discounting are used for fall purchases. With any of them the farmer can save a sizeable amount of money. The reason most farmers don't buy fertilizer in the fall when it can be bought at a discount is that they have no dry place to store it. Storing it in the soil solves the problem all the way around.

When Wheat Follows Corn

Fall application works well if wheat is following corn too. Herb Roadruck of Brookston, Indiana, likes to apply all of his fertilizer to his wheat in the fall at seeding time (500 lbs. of 12-12-12). Last year he applied this amount on all fields except one. Part of it had this standard application but on a part of it he split the application and applied 15-60-60 (300 lbs. of 5-20-20). In the following spring, he applied 35 lbs. of actual nitrogen (45 per cent urea). At harvest time, the plot with the complete fall application looked the best and yielded about 5 bushels more than the plot with the split application. Says Roadruck: "Of course, the split application is a headache because it makes more work. You have to get the grain drill out in the spring and wash it out completely and regrease it after the spring use before it is used for seeding spring oats or barley. The fall application with extra nitrogen in a 60-60-60 application provides the necessary plant food to induce tillering or stooling and also provides plenty of phosphorus which is needed by the young plants, especially when the Prime Mordea (cells which initiate head-size length and stalk) are being laid down, very early in the life of the plant.

"Another advantage of fall application is that the plants stay green all winter long and start off quickly with vigorous growth early in the spring. I think more fields of wheat and winter grains have winter-starved than winter-killed. Fall application certainly

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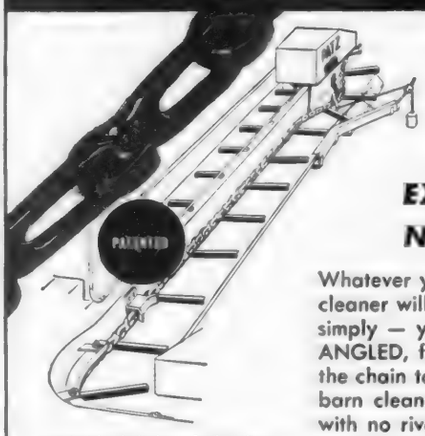

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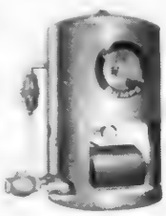

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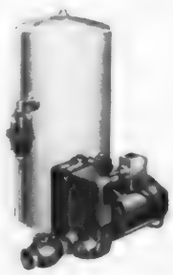

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makes better root growth, especially when plenty of potash is supplied in a high analysis formula like a 12-12-12."

It took Professor Pat Johnson, University of Illinois agronomist—he went underground with wheat roots—to find out what really makes plants winter kill, and what makes wheat plants look puny and sickly in early spring. Johnson found that potash was a big factor in root development in the wheat plant, as well as with all other plants. Professor Johnson noticed that wheat without complete fall fertilization did not always survive the winter. He began digging up the entire plants to study them. He found that plants with sufficient N and P but low in K were brown and the puny roots sent up small sickly shoots instead of green, lush, healthy leaves.

Fall application of a high analysis formula permits the plant food to be applied at about the same time as lime is applied to the field, if the pH level of the soil requires a lime application. Heavy trucks do less damage on fields in the fall with the long stretches of good weather than they do in the spring. It is much easier to get lime applied to fields if corn is to follow corn when the job is done in the fall. It is not always easy to get lime delivered just when you want it in the spring, even if the fields are dry enough in April or early May.

Too often when lime and fertilizer are applied in the spring, the job is of necessity done in a hurry and much of the plant food is placed on the surface or lightly disced in. Discing only mixes it with the top two or three inches and although it may place the plant food out of sight, it places it out of reach of many plant roots which feed downward rather than upward.

The key to turning corn stalks into useful organic matter is a matter of providing the bacteria that break down the stalk with the most favorable working conditions. It's very similar to mixing a steer ration that has the right balance; this has been worked out over the years to be 8 parts of carbohydrates to one part pro-

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North, south, east and west—more and more farmers are reporting bigger, better yields after use of Hybro-Tite, natural rock soil conditioner supplying potash and 19 trace minerals.**

We've asked the well-known distributors pictured on this page what growers in their localities say about Hybro-Tite.

Their response to the Hybro-Tite Roll Call speaks for itself: fine yields of so many different crops—corn, cotton, peanuts, potatoes, tobacco, tomatoes, wheat, barley, oats and other grains, grasses, row crops, vegetables, fruits, berries, soybeans.

Note particularly what they say about the way Hybro-Tite helps to cut production expense. Not only is Hybro-Tite low in cost, but its benefits are long-lasting. As it weathers, more and more of its minerals are released.

APPLY HYBRO-TITE THIS FALL! It's never too early or too late to put Hybro-Tite and its minerals to work for you. Spread just as you would lime – whenever machinery and labor are available.

Oregon

Farmer's cost low! "Hybro-Tite has been used in our area on pastures, strawberries, cucumbers, green beans, fruit trees (apples, pears, cherries, prunes). Outstanding success has been accomplished on gardens . . . Long lasting effects for several years makes the farmer's cost low."—A. M. Clark, Salem, Ore.

Pennsylvania

Premium prices for improved quality! "Hybro-Tite has been used on hay, pastures, oats, corn, potatoes, tomatoes, barley, wheat, tobacco . . . Productivity has been increased in every instance . . . premium prices have been offered for potatoes, tobacco and tomatoes grown on Hybro-Tite treated soils."—R. F. Walter, Manheim, Penna.

Illinois

Results produce big repeat orders. "Results have been so astonishing that bigger orders on repeat business have been the outcome. We are using Hybro-Tite on corn, oats, wheat, legumes, pastures and vegetable crops. Growth and vitality of several clover and oat fields are attracting considerable attention." – Roy Hoover, Gilman, Illinois.

Georgia

Feeds ⅓ more hogs or cows per acre. "Using one ton of Hybro-Tite per acre of pasture, seeded with Coastal Bermuda and Ladino clover, or Fescue grass, ⅓ more feed has been produced, making it possible to graze at least ⅓ more hogs or cows per acre. Hybro-Tite applied has resulted in an increase of 33⅓ to 40 per cent more cotton per acre . . . 30% increase in peanut production . . . 40 to 50 per cent more corn per acre." – O. W. Simmons, Statesboro, Ga.

Ohio

Big yields of many crops. "From tomatoes to potatoes, corn to clover, dahlias to African violets, peach trees to evergreens, Hybro-Tite plays no favorites in Ohio. Especially impressive are reports such as: Barley yield doubled at half the cost; 142 lbs. ripe and green tomatoes from one vine at one time; 4 ears of corn weighing 45 ounces from one stock." – H. V. Alexander, Marion, Ohio.

Kentucky

Big cash crop in spite of drought! "I have a customer who used only Hybro-Tite, Cal-Phos and manure on his tobacco crop. His crop from 3.2 acres paid him over $4,000.00. In 1954 he made another application and in spite of severe drought it brought him considerably over $1,100.00 per acre." – J. R. Griffin, Lyndon, Ky.

Indiana

100% satisfaction among customers. "We have sold Hybro-Tite for the past two years with wonderful results. We have 100% satisfaction among our customers. It has been used on corn, soybeans, tobacco, alfalfa, clover, trees, lawns, flowers, berries, gardens, crops of all kinds. Has shown wonderful results in greenhouses."—Joe Francis, Terre Haute, Indiana.

Wisconsin

Helps improve pastures: golf courses, too! "As a member of the Tripoli Country Club, I take an interest in the condition of the fairways and greens. Our head greenskeeper decided to try Hybro-Tite on some of the fairways . . . and as top dressing on some of the tees. By fall, because of the excellent condition of the turf where Hybro-Tite had been used, he made plans to cover considerable areas of the course with Hybro-Tite. Other golf courses in this area have started using Hybro-Tite also." – George La Budde, Milwaukee, Wisc.

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This booklet, "Nature's Own 20-Mineral Soil Conditioner," is free! Write for your copy today. Full of valuable information and case histories of the successful use of low-cost, easy-to-use Hybro-Tite. Address Charles L. Davidson, President.

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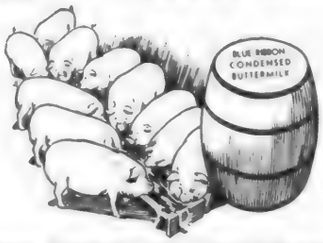

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tein. In simple terms carbohydrates are carbon, and protein is nitrogen. This 8 to 1 carbon-nitrogen ratio has been found to provide the bacteria in the steer's rumen with the best working conditions for encouraging digestion and making the most gain out of his feed.

Similarly in plowing down corn stalks, we have found that a carbon-nitrogen ratio of 10 parts carbon to one part nitrogren will cause the soil bacteria to do the best job of decomposing the stalks and leaves. So, our first job is to try to find out how close we are to this ratio and how to get to it. A good many tests have shown that corn stalks and leaves in the fall after harvest will average about 40 parts carbon to one part nitrogen. The fertilizing job to be done must be worked out to bring this ratio closer to the ideal of 10 to 1. Since the average corn field will have about 4000 lbs. of stalk and leaf residue and of this about 40 per cent, or 1600 lbs., is carbon, we can see that to arrive at a 10 to 1 ratio we will need 160 lbs. of N. If this N is not supplied from the bag or tank, the residues will pull nitrogen from the already low supply in the soil.

Wheat growers always used to burn the straw because they knew that when they turned it under yields were depressed. That was before they knew how the carbon-nitrogen ratio worked and before they had good supplies of nitrogen fertilizers to speed the decomposition. With legume crops turned under, there is not much of a problem of speeding decomposition for these are high nitrogen content crops. Alfalfa and clover residues will average 15 parts carbon to one part nitrogen and they will decompose into organic matter without much added nitrogen.

How the Carbon-Nitrogen Ratio Works

Oliver Cecil, Owensboro, Kentucky, has been shredding his corn stalks and fodder, applying high analysis plant food and lime, then discing and plowing all of his 500 acres for corn in the fall, for the last 15 years. And he has been building soil fertility, because he adds more than he removes. He plows down his corn stalks and fertilizes them so they decompose over the winter, rather than allowing them to oxidize slowly from standing on the sur-

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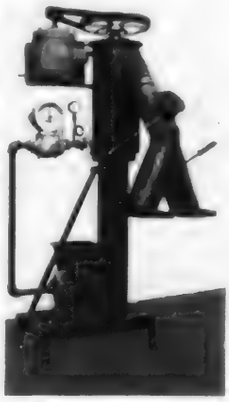

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face of the field. He has kept the carbon-nitrogen ratio at about 10 to 1 by adding 150 to 160 lbs. of N along with P and K each fall to the 4000 lbs. of corn stalk residue he has per acre. Cecil has found out the value of keeping a high nitrogen content in his soil, for his fields have been producing over 100 bushels per acre for the past several years and he has been able to do his job of producing 50,000 bushels from 500 acres with the extra time and fertility he gains from fall plowing. Cecil says, "I plow in the fall after I have applied the necessary lime and high analysis plant food. I like it best that way because I can get the ground ready on time in the face of any kind of spring weather."

Using the Warm Winter Days

We know now that soil bacteria will multiply whenever the soil temperature is 40 degrees Fahrenheit or above. Fall plowdown of fertilizer after a discing of the stubble gives the best mixing action for putting the plant food uniformly through the soil structure. Then, if the weather is mild, and many parts of the country have 30 to 40 warm winter days, every one of them will be used by soil bacteria to build soil fertility.

The idea that fertility leaches out of the soil during the winter months, which provided many a farmer with a reason for not getting out on a tractor seat on the frosty November days, has now been labeled for what it is, an old-fashioned idea. Actually, erosion over the winter and throughout the rest of the year is a far worse fertility thief than winter leaching. Soil scientists have put the over-winter leaching loss under 10 per cent when fertilizer is applied on crop residues before plowing them under. That is a cheap price to pay for all the advantages that come with building soil at the most opportune time of the year.

Of course there are some parts of the country where fall plowing should never have been done in the past and should not be done today. On steep slopes and land that is subject to wind and water erosion the only type of plowing that is really advisable is with a stubble mulch plow which does not invert the soil but leaves good mulch on top of the ground. In other parts

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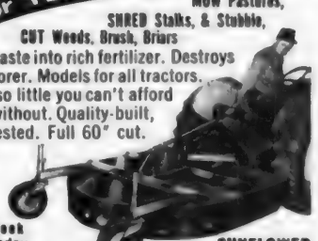

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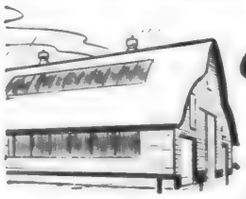

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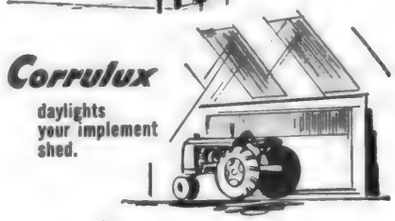

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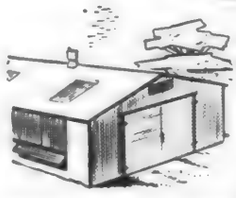

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of the country fall plowing can be done if it is finished in time to get a stand of spring oats up before the bad weather sets in. The oats will winter kill but still provide good cover and can be easily worked into the soil in the spring with a disc just before planting time.

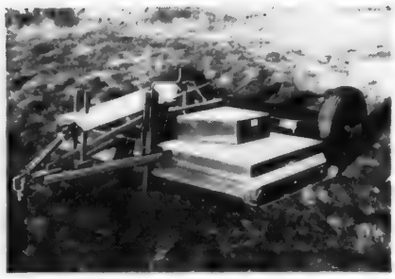
But the proof of any farming idea is in the final results at the harvest time. Among the men in the corn belt who have tried fall fertilizing with good to spectacular results are Chas. Schenk of Vincennes, Knox County, Indiana. He grew only 50 to 60 bushels of corn and 20 bushels of wheat when he plowed and fertilized only in the spring. During the past eight years he has fertilized and plowed in the fall and increased his yields to more than 100 bushels of corn and doubled his wheat yields. Les Boler, Winnebago, Minn., grew only 45 bushels of corn per acre until he started fertilizing and plowing in the fall and now yields have jumped to more than 100 bushels per acre—40,000 bushels from 400 acres and he plans to further increase his yields with heavier fertilizer application. Lester Pfister of El Paso, Ill., has been fall plowing and fertilizing and has succeeded in pushing up his yields to an average of 88 bu. per acre on 5,000 acres.

Profits go up when yields go up. It takes about 40 bushels to pay the costs of production on most farms when taxes, interest, labor, plowing, discing, planting, seed, cultivating, and picking are taken into consideration. The other bushels are the profit.

Schenk, Pfister and Boler all use liquid N in the fall, sprayed on chopped corn stalks. Schenk and Pfister use Uran 32 to provide their nitrogen, approximately 450 pounds of solution from which the soil will get the necessary 150 lbs. of N. Boler uses Nitrana solution to build up 140 pounds of N. All three of these men have used 0-20-20 in a bulk spreader to supply the P and K. Their total fertilizer is approximately 150 lbs. of actual N, P and K.

Says Lester Pfister, in summing up his experience with the work-spreading advantage of fall-plowing and fall fertilization, "Once a farmer tries it he will never go back to the old fuss and bother and night plowing that comes with trying to do it all in the spring. Believe me, it is a real pleasure to run the cultivator shovels through those corn rows and not bring up a lot of corn stalks. Instead you know that you have turned them into soil tilth."

THE AUTHOR: H. R. Lathrope was born on a Wisconsin farm, took his BS and MS degrees at the University of Wisconsin. For a time after he was graduated, he worked as soil mapper and taught vocational agriculture. He then settled down to a long career of 23 years as a county agricultural agent in his home state. He then went to Purdue University as extension agronomist, where he served 8 years. He is now Midwest agronomist for Nitrogen Division, Allied Chemical & Dye Corp. He has four children and lives in West Lafayette, Indiana, traveling all over the Midwest telling farmers how to grow bigger and more profitable crops.



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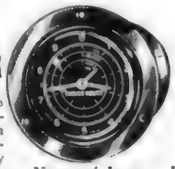

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BERMUDA GRASS

(*Continued from page 57*)

As a grass, Coastal Bermuda is remarkably rich comparing well even with the best legumes. Note the following analyses:

Hay	Protein	Fat	Fiber	Nitrogen Free Extract
Timothy Hay	5.6%	2.4%	30.2%	45%
Common Bermuda Grass	7.2%	1.8%	25.9%	48.7%
Coastal Bermuda Grass*	13.3%	2.16%	31.69%	48.65%
Alfalfa	14.8%	2%	28.9%	36.6%

*Where 400 lbs. of nitrogen per acre were used.

Unfertilized Coastal made hay of 7 per cent protein, similar to timothy. But where heavily fertilized the protein was almost doubled, exceeding 13 per cent. Yields are cut some by drouths, but not nearly like other hay plants. For irrigation to pay on Coastal, a high yield potential needs to be built with fertilizer. Applications of up to 900 pounds of nitrogen per acre did not increase the nitrate content of Coastal Bermuda enough to endanger the animals.

At the Georgia Station they have wintered two-year-old heifers and cows on Coastal Bermuda hay alone. They not only maintained health and vigor but averaged a gain of a third of a pound a day through the winter period.

Excellent silage can be made from Coastal Bermuda. Clippings from pastures that are getting ahead of the cattle can be thus used without any special treatment or preservative of any kind. It must reach the silo before wilting or water will have to be added. And it should be packed well in the silo, either pit or upright. This grass, as it stands in the field, carries 65 per cent moisture, just right for ensiling.

Experiment station results with it are backed up by a growing number of farmers over the South. Results from proper handling and heavy fertilization, especially nitrogen, are bringing phenomenal results. At first, fertilization of all grasses was meager. Folks just couldn't get to the point of putting it to the stuff they had fought all of their lives in row-crops. But the experiment stations gradually pointed the way. We saw the results and we wondered if it would work in the field. It did, and soon the farmers themselves were outdoing the experiment stations in pushing their applications up and up.

Norman Byrd, in cooperation with the Clemson Extension Service, ran the following experiment on his farm at Branchville, South Carolina, in 1954, the year of the great drouth.

Plot No. 1 was one acre of Coastal Bermuda. Fertilizer elements were applied in the ratio of 4-1-2. Materials used were 2,000 pounds of ammonium nitrate (20.5 per cent nitrogen), 500 pounds of superphosphate, and 350 pounds of muriate of potash. This was put on in 4 applications, using all of the superphosphate, 200 pounds of the muriate of potash, and 500 pounds of the ammonium nitrate in the first application in the spring. Following the first cutting of hay a similar application of the nitrogen material and the 150 pound balance of the muriate was put to it. Then following each of the next two cuttings 500 pounds of the nitrogen material were applied. This was a total of 410 pounds of actual nitrogen.

The data on these 5 cuttings follow:

Date Harvested	Number Bales	Total Yield Hay (lbs.)	Percent Protein	Total Protein (lbs.)
May 26	42	2,940	9.06	256.06
July 6	84	5,880	9.81	566.92
August 12	37	2,516	11.43	287.56
Sept. 2	70	4,760	15.81	745.55
Oct. 25	33	1,980	10.00	198.00
Total yield, 1 acre		**18,076 lbs. hay**		**2,054.09 lbs. protein**

Plot No. 2 was also an acre of similar grass. It was fertilized similarly but received only 120 pounds of nitrogen, and was cut every time the first plot was. It made 7,683 pounds of hay analyzing 7.66 per cent protein as against the high nitrogen Plot No. 1 which made 18,076 pounds of hay that ran 11.41 per cent average protein content. Total protein production per acre on Plot No. 2 was only 588.4 compared to the 2,054.09 pounds produced on Plot No. 1.

The Farm Book Store

The following books are recommended by THE FARM'S editors and are the best sellers during recent months.

***From My Experience** **$4.00**
Louis Bromfield's latest book about Malabar farm.

***Sprinkler Irrigation**
—by McCulloch & Schrunk **$6.50**
A thorough study of this fast growing practice.

***Dairy Cattle (4th ed.)**
—by Yapp & Nevens **$4.76**
A new edition of this practical book for dairymen.

The Livestock Book—by W. R. Thompson et al **$3.50**
This is the sequel to the best selling *Pasture Book*. It's a good one.

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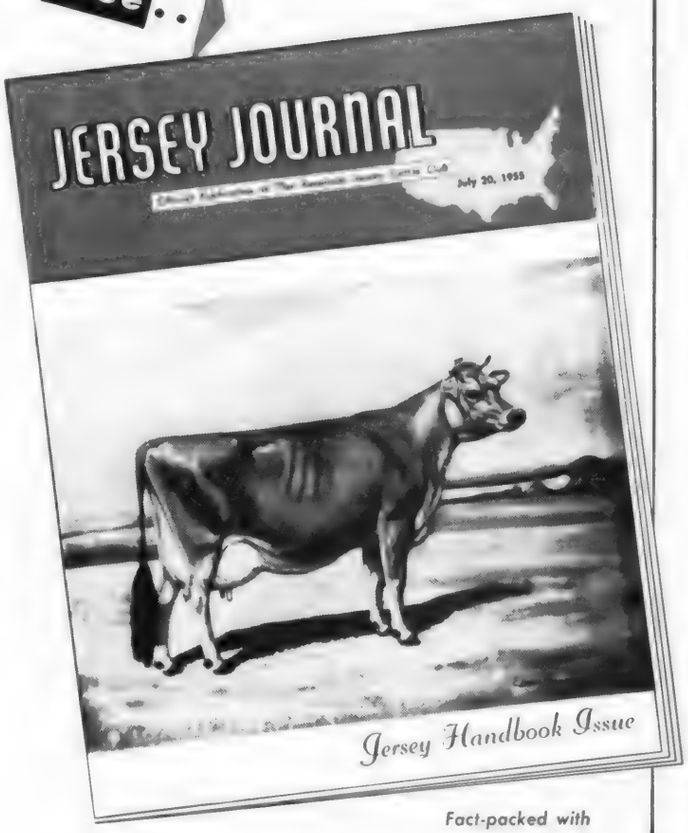

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Coastal Bermuda needs some help the first few months after planting, or weed and grass competition are likely to take it over. Some do hand hoeing. Others use chemical weed control (2, 4-D) quite effectively. Some use the mower or cattle to hold this competition down. If cattle are used they are turned on at any time needed during the first summer the crop is planted; turned on enough to nip down the competition, then taken off. They will get the weeds and other grasses which grow upright first and will not damage the Coastal.

The general area where Coastal Bermuda grass is adapted starts at about Brownsville, Texas, north to central Oklahoma, thence east through northern Arkansas and south-central Tennessee to the Georgia-North Carolina border, and on in a northeasterly direction to the southeastern tip of Virginia. Survivals have been noted 150 miles above this line, according to Dr. Burton, but winter killing is thought possible there. This grass definitely likes high temperatures and makes little growth when the mean drops below 60 degrees F.

Coastal's big forte is its ability to utilize heavy fertilization on the lighter lands and turn out big economic yields, even under droughty conditions. Extra nitrogen, up to 400 pounds per acre, has given about 2 pounds of beef for each pound of nitrogen used on it.

For dairy cattle, Dr. Burton says: "Coastal Bermuda has been found superior to other permanent pasture grasses for dairy

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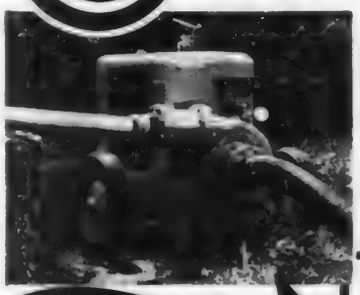

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Mike Behlen
Vice-President
Behlen Manufacturing Co.
Columbus, Nebraska

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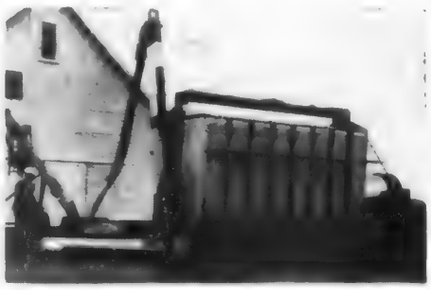

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cows. It has been inferior to cattail millet during the first grazing period when millet is young and tender. Later it has been equal, or superior, giving a total warm-season performance better than millet, the best temporary grazing crop now available for milking cows." Coastal Bermuda for dairy cattle will usually give the best results under continuous grazing. Grazing should be heavy enough so that the grass will not get over 6 to 8 inches high, insuring the added values of tender succulence and higher food values. Heavily fertilized Coastal Bermuda grazing can be increased at least 50 per cent by the moving-fence, one day grazing rotation system.

And here are some of the reasons livestock men are going for it: At the Tifton Experiment Station, with no nitrogen added to it, over a 3-year period, it gave an average of 259 pounds of beef gain per acre. Fifty pounds of nitrogen per acre pulled this up to 303; one hundred pounds of nitrogen, 481 pounds of beef. And 200 pounds of nitrogen added in equal spring and summer applications produced an average of 684 pounds of beef per acre.

Coastal Bermuda is an excellent hay crop. It contains less water and cures faster than other plants generally used for hay in this area. It is a perennial, thus saving annual planting costs. It is more dependable. Loss of leaves and rain damage in the swath often ruins legume hays in this area, but there are no such leaf losses in Coastal and its curing time is so short that weather damage to the hay is seldom and light. It makes higher per acre yields, and as many as 5 cuttings a summer spread the haying over a long season. Growth during summer is so much faster than in spring and fall that as much as half the pasture area can usually be set aside for hay.

Higher quality hay comes from the more frequent cuttings, but the greatest yield from less frequent cuttings. At Tifton, where 300 pounds of nitrogen were applied to Coastal on average sandy loam land, and the hay cut at varying intervals of 2, 3, 4, 6, and 8 weeks, the protein content averaged 17.4, 16.6, 15.2, 11.3, and 10.3 per cent re-

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Performance to your needs without costly and fancy gadgetry. Puts corn to the crib, baled hay to mow or stack, small grain to the bin with dependable efficiency.

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RATED THE BEST ALUMINUM ELEVATOR BUY!

15-gauge alum. alloy; Timken-tapered roller bearings; lengths—8', 12', 16', 20', 22', 24', 26', 28'.

GREATER CAPACITY

Bulk feed capacity is 10 to 20 tons per hour. Used by thousands in handling both bulk feed and litter. Acid-resistant. Easily hosed out for sanitation.

CARDINAL "Aug-O-Matic"
MOVES THE MOST MATERIAL FOR THE MONEY INVESTED—UP TO 10 BU. PER MINUTE

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Lengths— 8', 12', 16'.
Power—gas. eng. or elec. motor. Hopper optional.

● Removable head section ● Self-aligning bearing ● Heavy universal motor mount ● Sturdy swivel bracket for mounting support ● Reliable skid shoe on intake end.

YOUR BEST BUY

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spectively. Hay yield was the reverse, 5.6, 6.5, 8.5, 10.4, and 10.7 tons respectively. This grass cut at 5-week intervals should give hay of suitable quality for most livestock needs without materially reducing yield. It is relished by work stock and all sorts of cattle. Its nutritional level is high. Delayed cutting does not affect the quality of its hay as much as it does other hay plants.

Dunbar Oswald, who farms at Allandale, South Carolina, is convinced that Coastal is by far the best grazing plant he has ever found. "If you put the fertilizer to it, especially nitrogen," he says, "you had better have plenty of cattle or get your mower or ensilage cutter ready. It's my drouth insurance, too. During the past four summers I have had abundant grazing from it with very little rain."

J. H. Thames, a small farmer of Clarendon County, South Carolina, tells of his experience in getting a stand. "My advice to anyone who wants to plant a patch of Coastal Bermuda," he says, "is to prepare his land just as he would for cotton and fertilize liberally. Plant pure Coastal Bermuda stolons. Keep weeds and grass out, and don't get discouraged. Mine looked like a failure at first but it soon caught hold and took over."

Good yields of hay and grazing from highly fertilized fields of Coastal Bermuda in a year when most forage failed from drouth lead folks to wonder just what manner of grass this is, and just what yield and quality potential the breeder has succeeded in trapping in it. Even though we have reached the formerly unheard of fertilizer level of 410 pounds of nitrogen per acre in these tests, still it pays off and makes more economical feed of better quality than where fertilizer is used sparingly. Nitrate of soda and ammonium nitrate nitrogen have proven the most efficient on the grass.

If there is such a thing as a "wonder grass" for the Southeast, it is this Coastal Bermuda. We use many other grasses and clovers, too, and some of them, like rye grass and crimson clover, team up very well with Coastal, giving winter grazing from the same area. Annual lespedeza, sericea lespedeza, white clover, Ladino clover, red clover, subterranean clover, big trefoil, alfalfa, and sweet clover are others which have grown successfully with Coastal Bermuda. Combinations of these often give year-round controlled grazing from the same land.

The legumes are never seeded at the same time the Coastal Bermuda is sprigged. Reseeding crimson clover is the most commonly used companion and it is simply scattered on the Coastal stand the first fall after the grass is set in the spring. Thus the farmer need have no fear of using weed killer during the time the Coastal needs protection from competition.

The crimson clover adds enough nitrogen to the soil to be significant in the growth of the grass if the legume is not grazed too close. It grows in the winter

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This new FARM QUARTERLY department is open for advertisements of quality products and services. Rates 75c a word including each word in name and address. Minimum advertisement $18.75 for 25 words including each word in name and address. Terms: Cash with order. Circulation: 211,000. FARM QUARTERLY is read by the nation's ablest and most prosperous farmers. Advertisements for the Winter issue accepted until October 10th.

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CERTIFIED COASTAL BERMUDA especially prepared for mechanical planting. Digging season February 15 to May 1st. L. G. Bell, Frisco City, R.R. 2, Alabama. Phone URIAH 7160.

FOR SALE: Certified Coastal Bermuda Stolons, $1.00 bushel unpacked; Santa Gertrudis Bulls; Santa Gertrudis-Shorthorn Steers, Williams Farms, US 76, Mullins, South Carolina.

CERTIFIED COASTAL BERMUDA STOLONS—Certification Guarantees pure stock, free of COMMON BERMUDA, NUT GRASS, and other NOXIOUS GRASSES. Loaded into your truck at our farm, 40c per cu. ft. Also sold in paper-lined burlap bags (3,500 plants), moisture sealed and tagged "Georgia Certified," cash with order, shipped express collect. 1 to 19 bags, $2.50 each; 20 or more bags, $2.00 each. Order today. Free literature on request. Warrior Cattle Farm, Phone 2429, Sylvester, Georgia.

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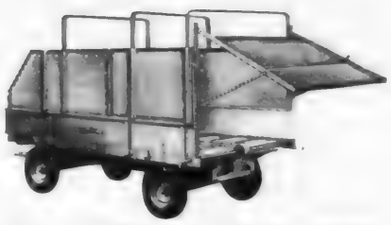
(Does away with need for elevator drag when bunk feeder attachment is used.)

★ **Buy the platform alone (fits any wagon gear) for $434.00 plus freight and handling from Bucyrus, Ohio; or in any combination—grain sides, forage sides and axles—you want.**



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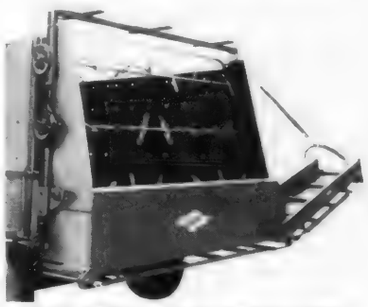

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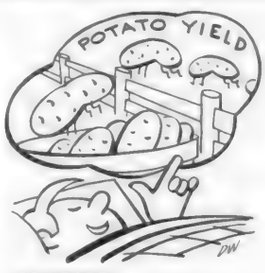

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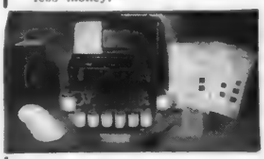

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INCREASE YIELD AND PROFITS PUT *Simplex* TO WORK FOR YOU

Use the right fertilizer and the amount needed. Simplex Soil Testing gives you an exact fertilizer prescription for your land and an estimate of the increased yield it will bring.

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one dollar gets you

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A dollar's worth of pasture fertilizer—properly used can bring you *five dollars* or more additional profit from beef and dairy products. You get these high returns when you follow state recommended fertilizer practices with a good soil management program.

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and spring and can be used as a feeder for the Coastal which comes on in the summer. It has been estimated that close to 100 pounds of nitrogen per acre have been added by the crimson clover in a stand.

Suwannee Bermuda grass is another promising hybrid suited to the very light sandy lands. In a four-year grazing test on poor sandy land at the Ona Experiment Station in Florida it made 13 per cent more beef per acre than Coastal. And in a hay experiment on a poor oak-ridge sand it recovered in the hay 76 per cent of the nitrogen applied. Coastal Bermuda recovered 67 per cent, and common Bermuda 25.

Except on very poor sandy soils, Coastal has proved superior to Suwannee, according to Dr. Burton. But folks still farm in deep sand and scrub-oak lands. Suwannee was designed for them. In South Carolina we now have nursery patches of Suwannee Bermuda grass coming along in all counties with areas of light sandy land. From these the county agents will get stolons for demonstration plantings over the areas. This is the way we got Coastal accepted so quickly. Every county had similar plantings.

Bermuda for the North?

Searching for a strain of Bermuda which would do well north of the Coastal Bermuda belt, agronomists have come up with another strain called Midland. It is the result of a cross between Coastal and a Bermuda obtained from Indiana. In Oklahoma experiments it has apparently done quite well, yielding from 1400 to 5200 pounds of dry matter per acre more than either Coastal or Common. We'll have to wait and see what its future will be.

Dr. Burton and his associates at Tifton, have also produced several low, close growing Bermudas for lawn and golf greens. Tiflawn and Tiffine Bermuda.

There are still those who are somewhat skeptical about Coastal. "You have to be a Yankee to like it," is the way one Georgian puts it. Another who recently mi-

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Trailer Mounted for Power Take-off Has traveling feed table and is especially designed for grinding or chopping larger quantities of loose or baled hay and roughage of any kind. Furnished either with or without Trailer Mount and Power Take-off. Both cutter knives and heavy swing hammers—it grinds any feed, green, wet or dry, snapped or ear corn, roughage bundles or baled flakes, with ordinary farm tractor and no monkey business. Get full information on real honest-to-goodness grinding outfits. Write for complete details.

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Seed drops ahead of rear roller section and is pressed firmly into soil by both Packer and Mulcher wheels. Leaves surface mulch without grooves. Great help in preventing washing, crusting, and blowing. Holds the moisture. Seeder mounted or removed quickly. Seed Bed Maker and Seeder available as combination, or each separately. Write for full details.

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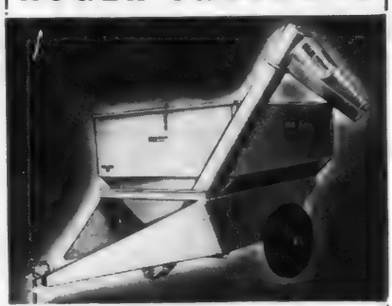

$295 F.O.B. FACTORY Less Tires

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Capacity 83.2 bushels. For light weight or bulky feeds or grain 1 ft. extensions can give 100 or more bushel capacity. Sturdy. All steel. 10 gauge frame, heavy gauge V bottom and sides. Complete with rotating shield PTO shaft. Standard 8 ft. auger elevator—front mounted. Extensions can be added to any height for unloading into bins. 15 in. rims.

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grated to the deep south from Kentucky, says, "This Coastal boom reminds me too much of the fescue fiasco in Kentucky a short time back. Sure, the stuff will make a lot of growth, but so will pine trees. I'm not saying it's no good but I want to see a few good stiff nutrition tests before I plant it all over my place."

That remark brings up the question of eradication. Coastal is much easier to get rid of than common Bermuda. Plowing and harrowing it during dry spells and raking the stolons out will eradicate it pretty effectively. Normal stolon harvests just seem to do it good.

THE AUTHOR: Jim Eleazer is an institution on southern farms, having served as county agent and extension specialist at Clemson College, S. C., since his graduation from Clemson in 1917. He writes a column widely published in southern newspapers, handles "The Voice of Clemson" on radio, and his name appears regularly in national farm magazines. He has written two books, one used as a text book in the state schools. He is a favorite author of FARM QUARTERLY readers.

MAN WITH A POWER HOE

(*Continued from page* 71)

inch tillers for three-point hitch tractors cost $776. Trailing types with auxiliary motors and heavy duty self-propelled rotary tillers go as high as $10,710 for the Seaman 7-foot giant.

Most six-foot models can cover about an acre an hour for fairly deep, once-over seedbed preparation, with two to three acres covered in a second pass. On most types, in-and-out control is hydraulic. Working depth, with a maximum of eight inches in general, is determined by the setting of skid shoes. Planters and grain drills can be hooked on behind a tiller to do a one-trip job.

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The past year has marked the appearance of new rotary giants, great and awesome mountains of bolts and castiron that surge through a forest, leaving it levelled and bare for grass seeding, or grind ahead through muckland, mixing head-high vegetation beneath the pulverized soil while completing all planting operations in one pass over a field. A Missouri machine, the *Land Master,* can prepare from two to six acres of heavy gumbo land into a seed bed in one hour. In Puerto Rican practice, this outfit is used to completely mix as high as 70 tons per acre of pineapple stalks with the soil in preparing for new

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Picks up, carries, dumps stones 1½" to 8" in diameter—clears up to 4 acres a day. Saves labor, eliminates many implement breakages, increases efficiency and productivity. Also clears stones from pasture land. Write for literature, giving name of your dealer to arrange demonstration.

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Alfred Moon's Rotavated soil is clean and not crusted without *cultivation following 9 consecutive days of rain.*

Alfred Moon examines his Rotavated soil. Rotavation is the only practical *way known to mix organic matter uniformly in the soil.*

How Rotavation gives crops a better start

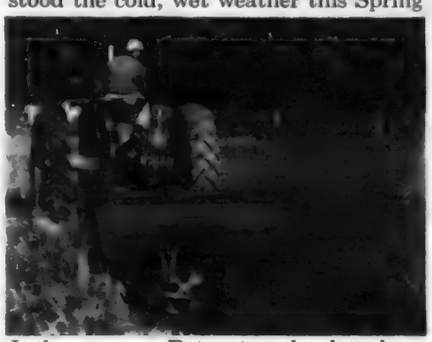
"I don't think I'll have to cultivate my corn more than once." *Alfred Moon, Star City, Indiana*

Here's what you can expect when a Rotavator prepares your land for planting:

1. ***Soil will admit moisture and air to encourage fast growth.***
2. ***Shallow pass before planting will kill all weeds; will not bring deep weed seeds to the surface to germinate.***
3. ***Organic matter will be evenly mixed into the soil.***
4. ***Soil will be aerated and left porous, not compacted.***
5. ***Land will resist washing and blowing.***

Take the case of Alfred Moon. In preparing his land for corn, he Rotavates shallow right after corn picking in the fall. This chops up the stalks and works them into the soil. In the Spring, he Rotavates deep as he prepares the seed bed for quick germination. As the weeds begin to sprout just before planting, he again Rotavates shallow and leaves his fields remarkably clean. In early June of 1955, when over 4 inches of rain fell on 9 consecutive days, Alfred Moon's corn was almost completely free of weeds!

"Erosion is no problem after Rotavation," says Mr. Moon, "and my corn stood the cold, wet weather this Spring better than it ever did before. Rotavated soil keeps an even temperature and seems to warm up down deep without getting baked on top." Rotavated land rarely has a crust of any kind. If a crust does form, it will never be thick enough to prevent needed moisture from soaking into the soil.



In fewer passes, Rotavators *do what plows, discs and harrows are supposed to do . . . but don't.*

While Alfred Moon's fields soaked up all water from a 9 day rain, this field across the road was left with pools of water on compacted soil.

Farmers all over America are getting better yields from their Rotavated land. Write today for more information. Better still, ask for a demonstration on your own farm!

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LET THIS GIANT
DO 3 TILLAGE JOBS IN ONE!

THE SEAMAN
SELF-PROPELLED
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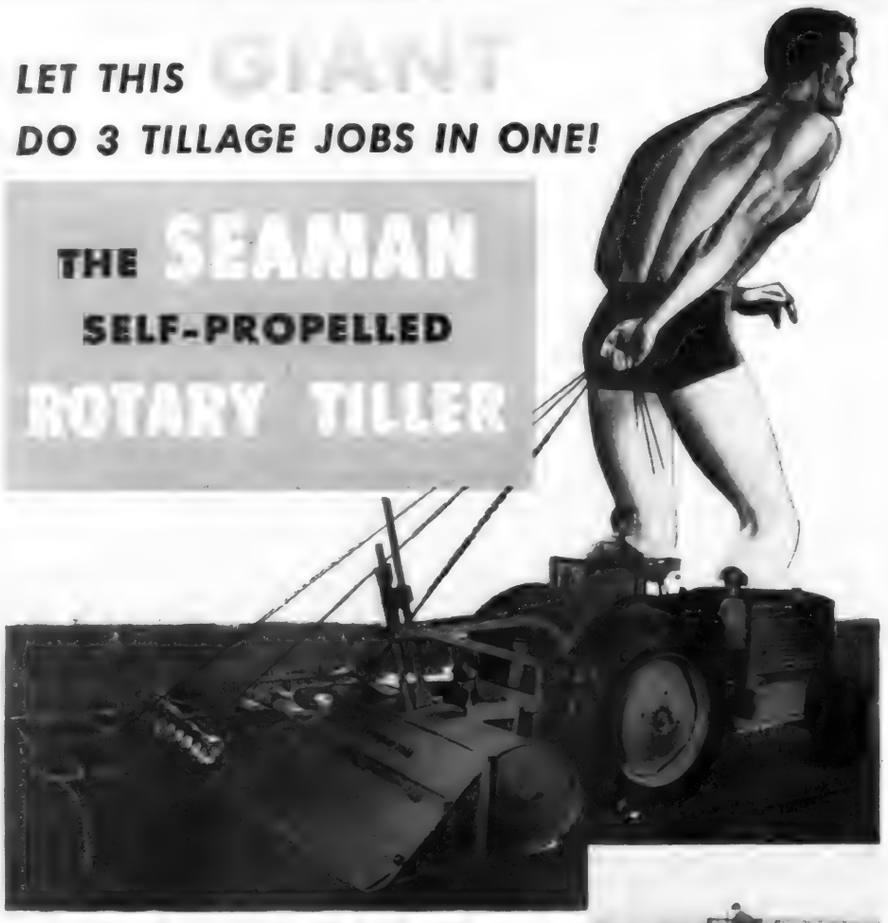

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- Medium, fine or coarse tilth as best suited to your soils and crops.
- Complete tillage in one operation:
  - — cuts labor costs
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The SEAMAN Rotary Stalk Mulcher
The answer to handling corn stalks or other trashy crops. Speeds decomposition, controls wind, water erosion. 5 ft. cutting width. Operates from PTO of most 3-4 plow tractors.

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8' 6" Loading Length

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AP-839	6 ft.
AP-840	8 ft.
AP-841	10 ft.

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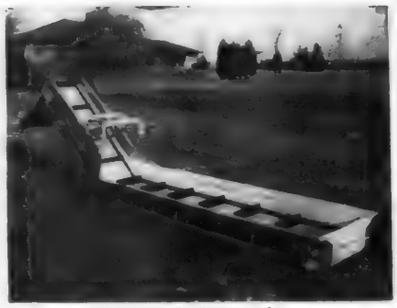

Also manufacturers of—
- Disc Harrows
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- Portable Feeders for Grain Elevators
- Concrete Mixers
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plantings, at an average fuel consumption of 1½ gallons per acre. The *Wonsover,* a $20,000 Maine behemoth, 10 tons in weight and 24 feet long, operated by one man, carries seed, fertilizer, lime and insecticides, roto tills the soil to a depth of 10 inches, plants the crop, firms the soil and crushes rocks as it moves. The tractor driver handles the entire operation from an electrical control panel.

The Bantams

On the other end of the rotary tiller line are the newer vacuum sweeper-sized "hoes", both gasoline and electric powered. They till a swath from 3 to 7 or 10 inches wide to a depth of 5 or 6 inches, and are particularly suitable for flower bed and vegetable row cultivation. Normal garden tillers come in all sizes and shapes. Flyweight models in the $150 bracket can't chew up heavy vegetation, but offer the advantage of handling with ease in tight places. They till a 10 to 16-inch swath to 5 or 6-inch depths, depending on conditions. These smaller machines are usually wheelless, with the front-mounted tines doing the cultivating and also giving forward traction. Depth and speed are controlled by handle-bar pressure. Heavy duty models, costing from $400 to $800, cut up to 24 inches wide, with maximum depths at about 7 inches. They usually have power-driven wheels placed forward, with the cultivating tines mounted in back. The higher horsepower sizes have hood enclosures for variable control of the mulching and pulverizing action, as with farm sized tillers. One middle-weight tiller operates somewhat like a revolving corkscrew, hurling the soil aside.

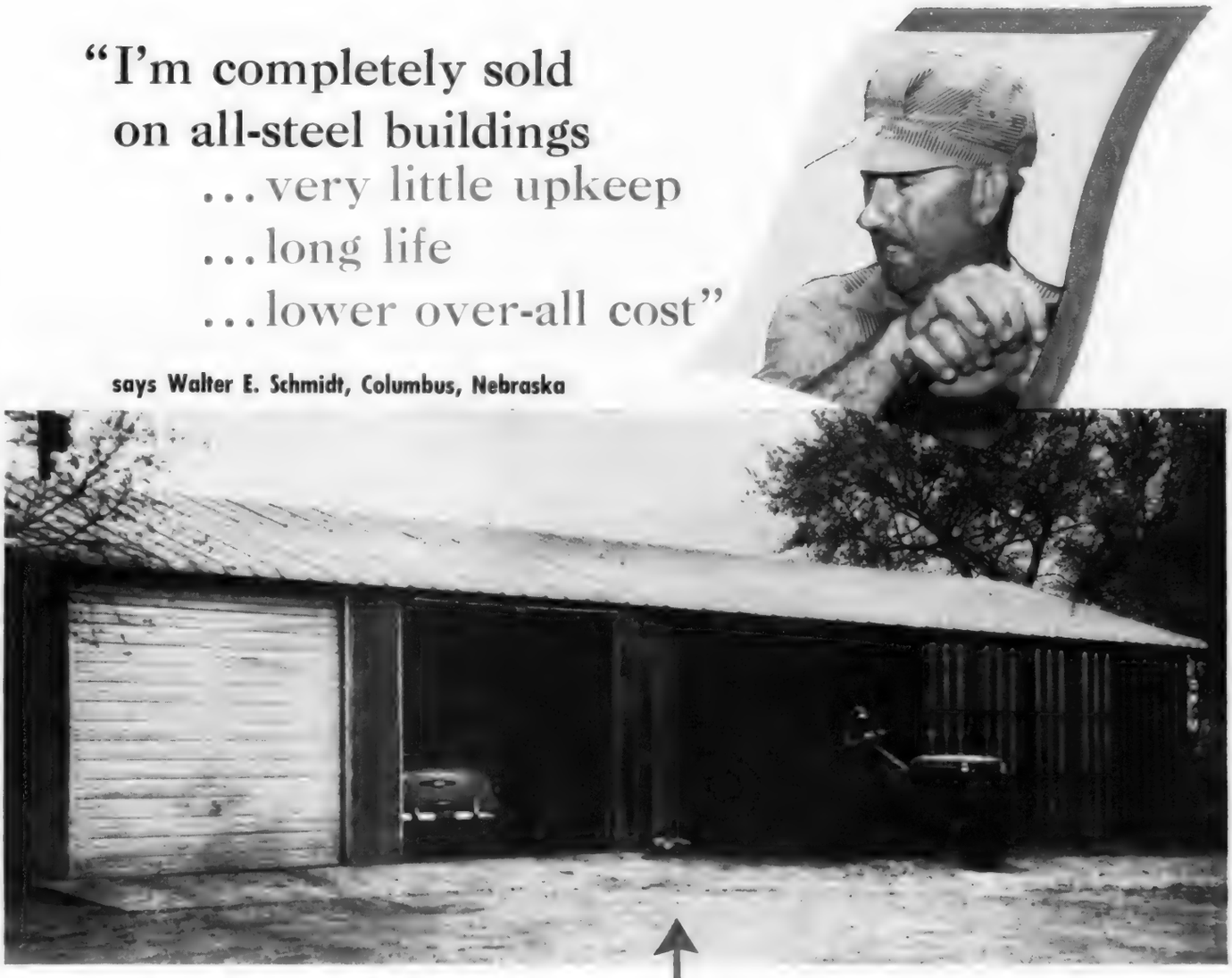
Other Applications

Both garden and farm rotary tillers have numerous other uses beside land preparation. Small fumeless and noiseless electric models are useful in stirring indoor nursery bench plantings or in stirring poultry litter in the henhouse. Lift type tractor models are liked by construction companies for lawn seedbed preparation around new buildings where their maneuverability enables them to work close to obstructions, unimpaired by the usual rubble left around new masonry work. Larger models are used in highway maintenance for powdering iced-over roads, with snow plows then used to remove the residue. On the farm, mounting a rotary tiller on the back of a tractor and a dirt scoop on front makes the construction of pit silos simple. Ditches can easily be filled by loosening the soil with a rotary tiller, followed by a bulldozer blade. Rotary tillers are often used to clear weeds from lake banks or other hard to manage spots. The weeds are chewed up, but the soil is only lightly disturbed. In building feed lots or farm lanes, many farmers have found a rotary tiller ideal for mixing in oil or bituminous products.

Tractor drawn rotary tillers are simple to operate. A child can handle them.

"I'm completely sold on all-steel buildings ...very little upkeep ...long life ...lower over-all cost"

says Walter E. Schmidt, Columbus, Nebraska



Mr. Schmidt's steel building has a big 16-foot sliding door which gives plenty of clearance for his large implements and harvesting equipment. He installed overhead doors in the older section of the building, and now uses it for a garage and shop.

Five years ago, Mr. Schmidt erected a 24' x 24' steel utility building on his farm. Just recently, he and his son, working in their spare time, added a 40-foot extension to it. "The old and new sections of my all-steel building match so well—fit so perfectly—you would think they were built about the same time instead of five years apart," says Mr. Schmidt.

Mr. Schmidt chose steel buildings for his farm because, in his own words, their "all-steel construction requires little upkeep for long life," and results in "lower over-all cost than other types of construction."

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Frank Rickman's ten-year-old son does it with ease. The garden variety demands some walking in return for the tremendous amount of work it will do. Both types can do a good job of ruining a piece of ground in a mismanaged soil program or can produce bumper yields under systematic conservation methods.

WORMS

(*Continued from page* 39)

else. It's hard to see the signs, too. If you have a rough, poor-doing calf, and he's listless and he keeps scratching his backside on a feed bunk, better suspect worms. Trouble is, adult cattle can carry a lot of worms before showing it. Almost all do have some worms. With cattle, you think of worms last when something ails them; in hogs and sheep you think of worms first. It's harder to spot worms in cattle manure."

That brought up another question, "Can cattle, sheep and hogs contaminate each other?" I asked him.

"Not too much," he said. "Most worms are specific for the animal. I mean that while a sheep stomach worm, for example, may belong to the same family of stomach worms as a cattle stomach worm, it won't live in cattle."

It is when Pop Ansen gets on the subject of worms in sheep that he becomes eloquent. "For my money," he says, "sheep would be the most profitable and the most satisfactory of all livestock if it weren't for the fact that they seem to be such suckers for worms. They don't get as many diseases as cattle or hogs, but they sure have more worms. Worst is the large stomach worms. I have lost lots of lambs from these pests. The nodular worms are about as bad. They cause what is known around here as 'knotty guts'. Lungworms can be bad if you don't keep your pastures clean. Liver flukes are not a problem here, but they are in some places.

"Tapeworms?—Why, I suppose there hasn't been a sheep alive that hasn't had a tapeworm. I sort of live with tapeworms—they don't seem to run a sheep down like the other worms and while they do take more feed, they don't damage his health unless he gets one when he's very young, and that might do him in. You take a big tapeworm out of a lamb, and watch it squirm and writhe, and you wonder how an animal can keep it in him. It's a slimy thing. I have seen lambs in the slaughter house with a hatful of tapeworms in them just as heavy and the same grade as their brothers and sisters with very few tapeworms. I fed those tapeworms, and that cost money."

I wondered if seeing the worms in the manure were the only way of recognizing infestation in sheep. Pop had the answer for me. "I've got a rule that's more or less my own," he said. "I keep a close eye on the color of the sheep's hide. Part

the wool at a few places, especially tender places like under the neck. A healthy sheep has a cherry pink skin. Pale pink usually indicates worms. The paler, the more worms. In a really bad case of nodular or stomach worms, the skin turns yellowish.

"The drugs that are on the market to control sheep worms are a little more effective than for any other class of livestock. What the worm people call low-level feeding works all right with sheep; that is, you feed it 'round the year as a part of their feed or as part of their mineral ration. If you want to give it this way, mix one part of phenothiazine to 9 parts of salt, by weight.

"Most of the sheep men I know control worms pretty well by this method but many of them also give seasonal doses. For example, powdered phenothiazine can be mixed at the rate of one pound to one and a third pints of water. This treats 18 adult sheep. Sheep should have this especially during the grazing season and the treatment should be started early enough so that spring pastures are not contaminated by infested animals.

"You generally find some sheep in every flock that don't eat enough salt, or, for some reason, get more worms than they should have. For these, I give one ounce of phenothiazine in capsules or as a drench to adult sheep, or a half ounce to half grown lambs. You can also mix this in a day's ration. Some fellows say you shouldn't give phenothiazine to an animal that doesn't need it, but almost all need it. It's uncommon to find a worm-free sheep. They eat the grass right down to the roots, and pick up worm eggs right off the ground. Being out day and night, they get a full diet of worm eggs and larvae when they eat wet grass after a rain or a heavy dew.

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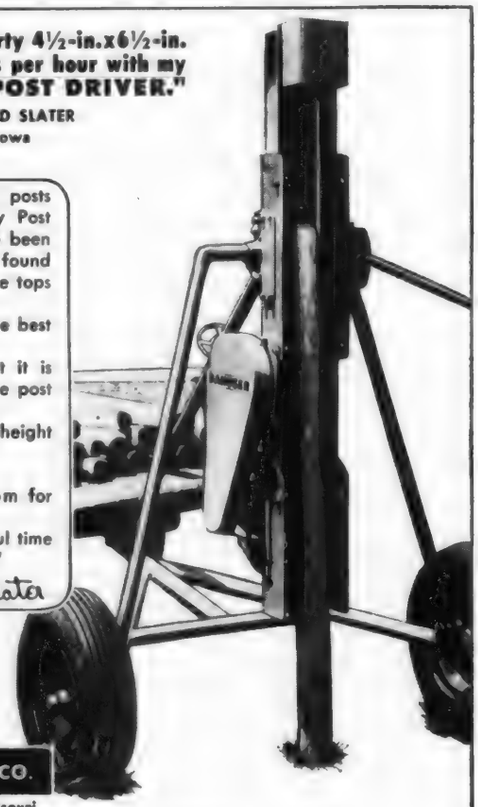

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"There is a direct correlation between worms and climate. Worms are more of a problem in humid areas than in dry areas for the reason that the eggs and larvae, when discharged in the manure, like a damp environment.

"Old-timers were against letting animals out on wet pastures. We used to think this was more or less of a superstition, but we know now it is pretty sound fact. Worm larvae, which hatch in manure, have no climbing claws and they depend on surface tension of a wet blade of grass in order to ascend it. My friend, Dr. Turk, says that the larvae concentration on pasture grasses is many times more at 6:00 o'clock in the morning than it is during the dry, middle part of the day. As the grass dries, the worms gradually slide back to the soil. Larval life in colder climates is much longer in days than it is in warmer climates. In dry grass, the larvae may die within a week and dry grass is associated with warmer climates. In the cooler states, larvae will be alive in the fall and when the cold weather sets in, they are inactivated and will hibernate over the whole winter period. When the warm sun comes along in early spring, they are all set to find a host.

"Carbon tetrachloride is for liver flukes. Two doses of 1 cc. each should be given at intervals of 3 or 4 weeks in the late fall. It's dangerous and somewhat out of date. If you want to go after flukes and tapeworms, ordinary spray-grade acid lead arsenate is all right if you are careful with it and don't over-dose. It is very poisonous. A little in a sheep's lungs and he goes out like a light. The dose is from a half-gram to a one-gram capsule per adult animal without fasting.

"Hookworms may be a problem, too, in both sheep and goats. Goats have about the same problems with worms as sheep, right down the line. If you don't keep their bedding clean and dry, they re-infest themselves quickly. They don't have to eat the worms; they get them through the skin. The best drug to use against the hookworm is tetrachlorethylene. For dosage, consult your vet.

"Being a careful housekeeper does just as much to control worms as drugs. Feed troughs should be high enough that they don't become contaminated with manure. Keep feedlots clean and fence sheep off

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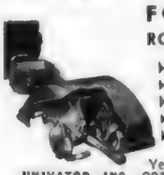

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swampy ground. That's where the worms breed, especially the flukes.

"There are a lot of good worm medicines on the market and when the good ones are used according to the directions, they do a job. Of course, the most common and the best for the ordinary worms is phenothiazine. Most of the drug makers use this in combination with such other drugs and chemicals as copper sulfate, lead arsenate, sulfaguanidine, cadmium anthranilate, piperazine compounds, nicotine sulfate, cadmium oxide, tetrachlorethylene, and sodium fluoride.

"Only the cadmiums, phenothiazine, sodium flouride and the piperazines can be given safely in feeds. The others have to be given to individual animals. You ought to find out from your veterinarian what worm you are going after, then get the medicine that goes after the worm.

"Remember that phenothiazine, although it has been called a miracle drug, won't touch lungworms, whipworms, or tapeworms, and even some types of roundworms. You also ought to remember that dogs won't tolerate phenothiazine and sodium flouride will kill cattle.

"Worm specialists are splitting up into two camps—the low-level feeders and the high-level feeders. The low-level fellows say that you ought to feed a drug 'round the year as a preventive measure. The high-level people say that periodic dosages will do just as good a job and you won't run as much danger of poisoning the animal. In some wet areas where re-infestation is continual because of the climate, a low-level treatment is advisable.

"There's so much common sense to low level treatment, or subtherapeutic treatment, as the scientist calls it, that I wish we could bring it down to a safe, sure method. I read a piece the other day by Dr. A. C. Todd, of Wisconsin, which makes sense to me. He said, 'One of the reasons why periodic treatment doesn't always work is the human equation. It doesn't work because the farmer can always find a reason why he can delay treatment even when it is needed. He can find a reason why he must plow his corn today and worm his pigs later when it rains. Then when it rains, he can find a reason why he has to go to town instead of worming the pigs. No farmer likes to treat pigs or cattle individually because pigs and cattle are rough and tough. A man can

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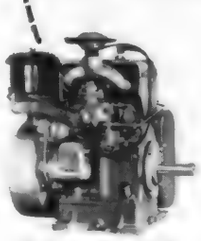

This is the Model TF 2-cylinder Wisconsin Heavy-Duty Air-Cooled Engine that supplies complete power for the Owatonna Grain Swather illustrated above—3¼" bore x 3¼" stroke, 53.9 cu. in. displ., 8.7 to 14.6 hp., 1400 to 2600 rpm. Larger size swathers are powered by the Model VF4 V-type, 4-cylinder Wisconsin Engine.

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Typical of the practical ingenuity employed by farm equipment designers and builders for the most advantageous utilization of engine power is this Owatonna Grain Swather, made by Owatonna Mfg. Co., Owatonna, Minn.

A unique feature of this Center-Delivery Grain Swather is that it opens up all types of grain fields without running down standing grain. Mechanically operated aprons at both ends of the machine carry the grain, as cut, to the center opening, depositing it in a compact, uniform swath for clean, easy combining. The floating cutter bar extends over the entire length of the machine, forward of the wheels.

A remarkable feature of this equipment is that an engine as small as a 2-cylinder Wisconsin furnishes the necessary power both for *propelling* and *operating* this big machine. It's an assignment that calls for heavy-duty Lugging Power and foolproof AIR-COOLING at temperatures up to 140° F. Here is a perfect example of *Power to Fit the Machine, Power to Fit the Job!*

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get hurt trying to use a drenching syringe or a balling gun on a 120 lb. pig or a 1000 lb. steer. The vets don't like to do it, either, because most of them have a broken bone or a chewed-off finger to prove their unhappy experiences. Since parasites are chronic with animals, a scientific low-level treatment, which we are rapidly working out, is the most practical.'

"I lean toward the periodic treatment mainly because I've used it a long time, and I'm willing to take the time.

"Having made my mistakes, I want to say that anybody that gives an animal drugs ought to know what he is doing. He not only ought to know the danger of too big a dose, but he ought to know his individual animals and what each one can take. If your experience doesn't tell you, and you haven't too much faith in the label on the bottle, get your veterinarian in for advice. The only thing you have to remember is that you have to fight worms from now on, and if you want to make money in livestock, you ought to take the time to know how to use the drugs on the market."

Pop said he had chores to do and anyway he had told me more than I could remember. As I left him, he dropped a gem. "I don't actually hate worms like some people. They have the same right to life that people have. If they had more intelligence, they would probably be inventing poisons to get rid of us as we do with them. Worms were here before we were and they will probably be here after we're gone. We're trying to throw them out of the homes nature intended them to have. We ought to make it a good, clean, aboveboard battle and not accuse them of being evil. They are just doing what nature intended them to do."

HOG INDEX SYSTEM

(*Continued from page* 66)

The index numbers that Terrill speaks of are the production ratings given pigs under the Wisconsin system, which was started in 1944 by Dr. A. B. Chapman, a geneticist, and the late James J. Lacey, a professor of animal husbandry. This system attempts to select those genetic characteristics of the hog which make a profit for the farmer. All of the hog's physical characteristics are influenced by heredity, from the color of its eyelashes to the strength of its vocal chords, but the ones which interested these scientists when they devised the system were litter size, fast growth, and good feed efficiency.

After selecting the important factors, Chapman and Lacey then assigned each factor a numerical rating based on its economic importance and also on its degree of heritability. The sum of these numbers is the index figure that is used by the farmer in making his selections for his breeding herd.

"The exact means of arriving at indexes

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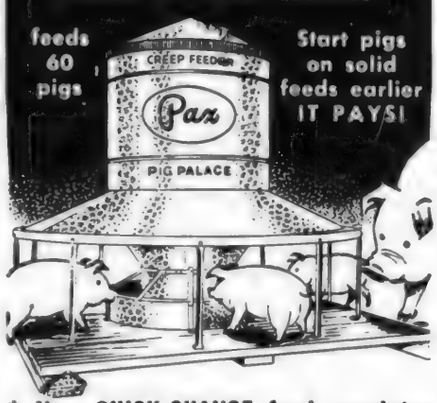

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from heritability figures and those showing economic importance is an involved mathematical study," Dr. Chapman said, "but amounts to this: We attempt to balance the economic values of characteristics, one against the other; we attempt to balance the degree to which they are transmitted from one generation to the next against each other, and in that way come up with a single figure on each animal that reflects these features which we think need to be taken into account. That figure is called the selection index."

In assigning numbers to characteristics, one point is given for each pig farrowed; two points for each pig raised to five months; points to emphasize good growth are arrived at by dividing the weight of the litter at five months by 100 and using the quotient as the number of points; seven tenths of a point is given for each pound over 70 that the individual pig weighs at five months; and if the pig was born in the first litter of a gilt under 18 months old, 10 points are added to make the index comparable to the index of a pig out of a sow.

When a farmer, such as Ed Terrill, applies these figures to a specific pig, it will add up to something like this:

One point for each pig farrowed (pig from litter of 8)	8
Two points for each pig raised to 5 months (all 8 pigs raised)	16
Total 5 month litter weight divided by 100 (litter weighed 1,400 lbs.)	14
.7 of a point for each pound over 70 at 5 months (pig weighed 175 lbs.)	73.5
Ten points for pigs farrowed by gilt under 18 months	10
Index number of this pig	121.5

In this way, each pig from the litter has an index number. And the farmers are urged to keep records on every animal in the herd so that they have as complete a picture as possible of each generation.

Terrill's experience reveals the need for complete herd records. Starting out with 13 sows and no production records on them, the University figured an index number for each pig farrowed and he selected his breeding stock from those with the highest index number. With each litter farrowed he followed the same procedure, culling out the poor producers and keeping those with high index numbers. In going over his records recently, he found that all of his present herd of sows and

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gilts trace back to two of his original 13 sows. These two were the ones which were able to pass on the producing ability which has increased the amount of pork per litter of pigs by 20 to 25 per cent. Only by indexing all the pigs was he able to single out the high producers.

To take the sting out of record keeping, the University has prepared a single record card with space for all of the information needed for a single litter. On this card are shown the farmer's name; information on the sow or gilt: litter number: birth date of sow: breed: purebred, crossbred, or grade: information on boar; the earnotches for each individual pig along with its sex, birth weight, five month weight, index number (which is later filled in by the University), and remarks about the pig.

In the space for remarks, the Terrills keep such information as number of teats, hernia, accidental death such as the time a gate fell and killed two pigs from a litter. These remarks along with the index numbers help in their selections.

There is also a space for weaning weight on the card which a farmer may use but doesn't need to in order to have an index number assigned the pig. Terrill weighs his pigs at weaning so that he can get an idea of their rate of growth and their gain on feed. He has found that by checking the rate of growth from weaning to five months, he can project this growth into the future and pick out by ear notch a truck load of 210 pound market hogs without using scales and without missing the mark by more than 10 or 12 pounds for the whole load.

When the farmer's information is all entered on his cards, he sends them to the University where the index numbers are figured. These figures tell the farmer how each pig is doing in comparison to the others in his herd. In this way comparison is made only between animals under the same environment. The University also sends him the average index figures for all animals under the program.

With this mass of information flowing in, along with experimental work, Dr. Chapman has fairly accurate figures to show what per cent of the change from one generation to the next is due to environ-

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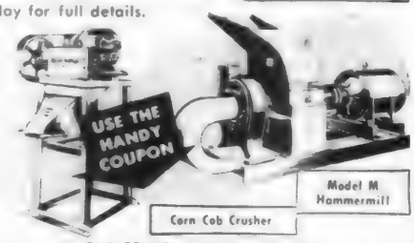

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ment and what per cent to heredity. "Part of the variation that we find in the number our animals farrow and the weights of the individual is due to things that happen to them during their lifetime, such as feeding, management, disease, and other factors," he says, "but part of the difference is due to the inheritance from the parents."

Heritability for litter size, they have found, is somewhere between 10 and 15 per cent; weight at five months was found to be around 20 per cent heritable. Such figures as these have helped the scientists behind this program assign their weighted figures from which the index number is totaled.

During the four years he has been following the program, Terrill has been able to make his selections in the female line only. His boars he has bought without knowing too much about the producing ability they were breeding into his herd. Three of these boars were good—one he will never forget or forgive. This fellow produced, among other things, three gilts that wouldn't give milk, and four sets of Siamese twins to four different sows. One of these monstrosities had two bodies attached to one head that sported four ears, three eyes, and a single snout; another that was joined at the head had two ears, four eyes and two snouts; another set was joined crosswise in the middle of the back; the final set at the rump.

From here on in, Terrill has decided to buy production indexed boars at the sale sponsored by the University. This sale, which is to be an annual affair, was started in 1954. Boars with a high index number will give Terrill a chance to add productivity from both sides of the pedigree.

Terrill need not have waited so long to get a boar with a production record; purebred breeders who have followed their breed association's production registry program are selling them every day. Since 1945, a year after Chapman and Lacey began the Wisconsin system, all of the breed associations have been pushing a production registry (PR) program. The PR system, which is quite rigidly policed by field men and county agents to see that it is operated honestly, calls for records showing the number of pigs farrowed and the litter weight at 56 days. No litter can be entered if any of the pigs have swirls on the upper half of the body or if any of

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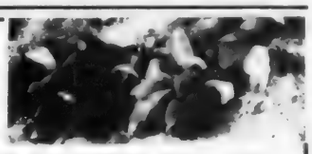

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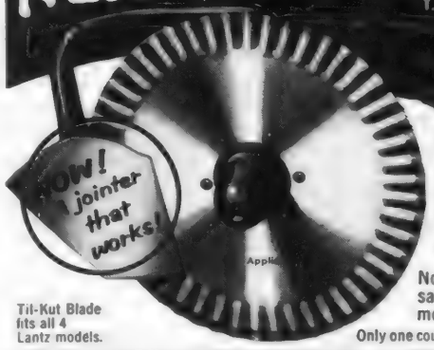

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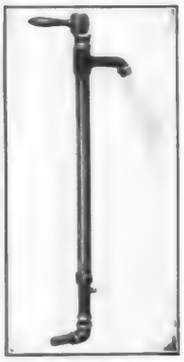

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them have a hernia or cryptorchidism (which is pig latin for ridgling or one testicle). A qualifying litter consists of at least eight pigs raised to 56 days without the aid of a nurse sow and having a minimum litter weight of 320 pounds, for a sow's litter, or 275 pounds for a litter farrowed by a gilt under 15 months at farrowing. Terrill could not have translated the PR rating into a production index figure, but if he bought a boar from a third or fourth generation PR tested line, he would have an animal that was well above the average in its ability to breed productivity into the herd.

This year several of the breed associations are launching a new testing program to go along with their PR system. This new program is designed to single out the blood lines which are producing the meat type carcasses the marketing experts talk so much about. In this program, a typical pig from a litter which has qualified under the PR rules is butchered and put through a careful cut-out test. Primal cuts, fat, and offal are all carefully measured to show which lines produce quality meat.

Probably the most rigorous search for meat type lines being carried on today is the testing done by the Swine Improvement Association at Ohio State University. Here, two pigs, preferably a barrow and a gilt from a litter which would qualify for production registry, are taken from the farm at 60 days of age and shipped to Columbus to the new swine evaluation station. In one of the station's 108 individual pens, the pair are raised to slaughter weight. Careful records are kept on amount of feed eaten, daily rate of gain, and amount of feed it takes to produce 100 pounds of gain. So far, the figures show that the average pig entered in the program comes from an 11 pig litter out of which 10 were raised to weaning; the average gained 1.74 pounds a day and reached a slaughter weight of 204 pounds in 100 days at the station in addition to the 60 days on the farm; feed conversion was at the rate of 343 pounds of feed for each 100 pounds of gain.

At the end of the test, these pigs are slaughtered and their carcasses tested at the meat laboratories of the university. To qualify for certification under the program at least 47 per cent of the live weight must cut out in trimmed primal cuts which include skinned ham, trimmed loin, trimmed belly, and New York shoul-

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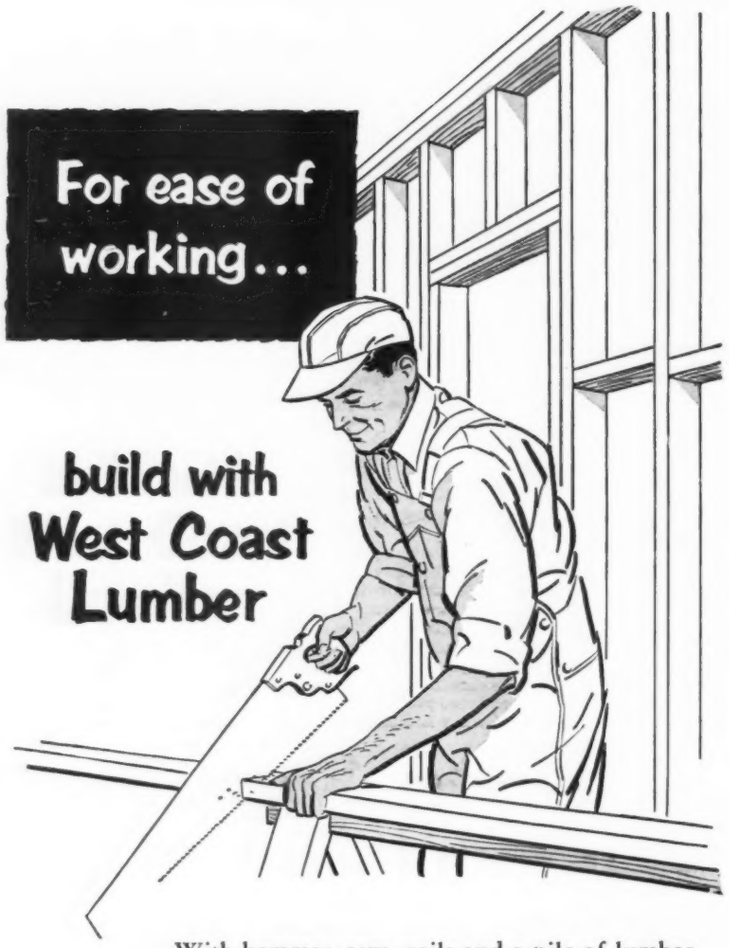

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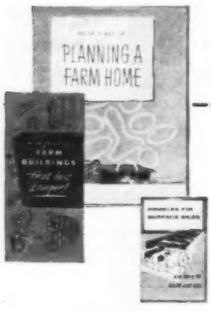

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der. A number of other measurements are taken and recorded, such as thickness of back fat, square inches of loin at the tenth rib, and per cent of fat trim to live weight. Part of the cost of this program is met by the breeders themselves. One of the two pigs they send for testing is given to the laboratory; they are paid for the other at the going market rate.

Thousands of farmers are using these programs and those developed by Iowa State College, Purdue, University of Illinois, and other agricultural colleges to guide them in their breeding selection.

There are critics, however. Most of whom begin with, "This is a good idea, but . . . " One of these, Earl Hamre, a neighbor of Terrill's who, with his brother Robert, raises 42,000 broilers a year and runs a 75 sow pig hatchery, says, "I think the Wisconsin program is fine as far as it goes, but we feel that the most important thing to worry about today is feed conversion. In the broiler industry we emphasized feed conversion and then worried about quality. I feel that we hog raisers are going to have to go right down this same road. If hog raisers go on pouring four and five hundred pounds of feed into their pigs for each hundred pounds of gain, they won't be in business long enough to improve the quality of their pigs."

Leslie O'Brian, whose herd records go back 55 years on the purebred herd his grandfather started, speaks for a lot of hard-shelled hog men when he says, "These production testing programs are excellent for the farmer who is raising hogs, but a real hog man doesn't need them. I don't need the university to come out and tell me how much a pig weighs—if I did, I wouldn't be a hog man. Sixty years ago my grandfather told me, 'The farmer who feeds his pigs and doesn't stay around to watch them eat won't learn much about pigs. You sit on the fence every day and get to know your pigs and you'll develop into a good hand with hogs.' "

THE AUTHOR: Ed Mercer was born in Texas and was one of two survivors of his immediate family in the Galveston flood of 1918. He went to Wisconsin shortly after and grew up happily on a 125 acre dairy and hog farm. He graduated from the University of Wisconsin College of Agriculture and was editor of *The Black Fox Magazine*, news editor and feature writer for *The Chicago Daily Drovers Journal*, editor of *The Manufacturing Confectioner*, and farm editor of the *Wisconsin State Journal*. He joined the staff of The Madison Advertising Agency, as copy writer and accountant, in March, 1953. He does extensive free lance writing.

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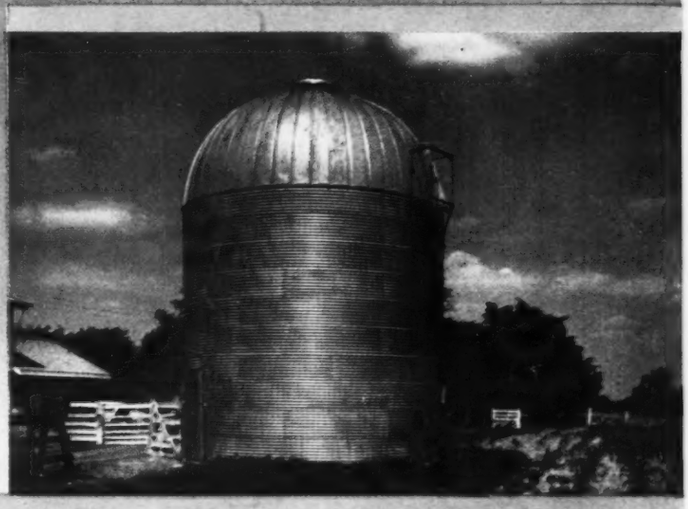

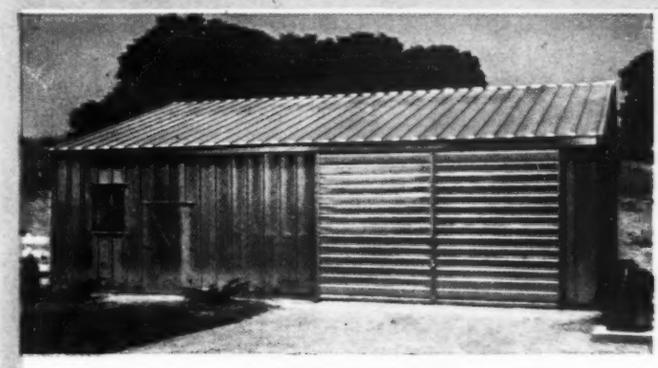

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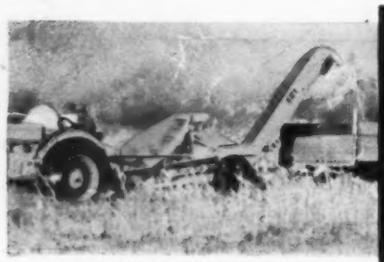

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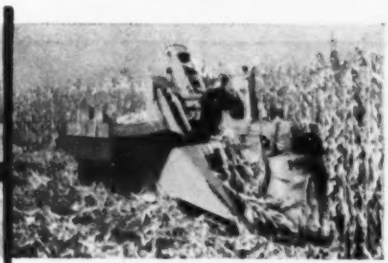

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